

# ANNALS OF THE Missouri Botanical Garden

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## THE WOODY PLANTS OF ALABAMA<sup>1</sup>

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### ABSTRACT

Woody plants of 437 taxa in 177 genera and 74 families are presently verifiable as native, naturalized, or escaped in Alabama. The occurrence of six major physiographic provinces and a broad climatological range are contributing factors to the persistence of high floristic and vegetational diversity. Keys to the taxa and maps of the distributions of the plants are included.

### INTRODUCTION

State-wide treatments of Alabama plants by Mohr (1901) and Harper (1928), while of consistent quality, display shortcomings which the present study hopefully may begin to remedy. Both Mohr and Harper were limited by transportation,

<sup>1</sup> One of the surest effects of completing a floristics project of this scope must be an awareness of unrepayable debt to one's colleagues. Indeed, the taxonomic judgements of the present writer's predecessors and contemporaries are the principal means through which his own concepts of groups have evolved. In a very real sense, one's judgements are not his own, but represent a modified amalgam of those of others. In this regard, appreciation is due the following: W. W. Ashe, H. R. Totten and C. H. Muller (*Quercus*), H. E. Ahles (Rosaceae), W. P. Adams (*Hypericum*), J. R. Baird (Myricaceae), and P. C. Baker (*Vaccinium stamineum* complex).

Other persons have aided the writer in a more tangible way, by examination of certain groups: J. W. Hardin (*Fraxinus*, *Aesculus*, *Spiraea*), S. McDaniel (*Vaccinium*), R. L. Wilbur (*Wisteria*, *Amorpha*, *Robinia*, *Gleditsia*), W. H. Duncan (*Vitis*, *Smilax*), E. W. Chester (*Halesia*), P. J. Crutchfield (*Quercus*). Their determinations and verifications have been valuable to this project. In addition, the following treatments have been important to the formulation of concepts concerning certain groups: Adams (1957, 1962), Camp (1942), Eyde (1963), Hardin (1957), Logue (1967), and Wood (1961).

Portions of this work were completed while the writer held a Coker Fellowship in the Department of Botany, University of North Carolina, Chapel Hill.

In large measure, the successful completion of this project has been due to the continual hospitality and hospitality extended by the T. A. Heard family, formerly of Weaver, Alabama. Collection of the northern Coastal Plain was greatly facilitated by a stay at the residence of the G. T. Stovalls, formerly of Marion, Alabama.

Special appreciation is expressed to A. E. Radford for his direction and support of and enthusiasm for this work.

Finally, I wish to thank my wife Nancy for the tremendous sacrifices she underwent and the large amount of careful assistance she rendered.

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Mohr's work being accomplished largely from horseback, and Harper's through transport by others. While, in the opinion of this writer, the taxonomic penetration of Mohr was superior, that of Harper was occasionally uneven (though quite excellent for an ecologist!).

The present study provides material which has been previously unavailable relating to the occurrence and distribution of Alabama woody plants. Ideally, through its vouchers, this study will furnish useful data regarding patterns of variability of Alabama woody plants. Hopefully, the present study will function as a stimulus for more active collecting in the area studied. Some of the material presented here should be useful—in a larger context—to further investigations of the distribution and evolution of the Southeastern flora.

Part of the value of this work should lie in the re-exposed problems of a taxonomic nature posed by a significant percentage of the taxa treated. One hopes that among these possibilities of usefulness, this study might also enable amateurs and laymen to become more aware and appreciative of a fast-disappearing, irreplaceable aspect of their environment.

It is widely recognized that no uncontestable definitions exist of what a Temperate Zone woody plant is. Plants considered woody in this study are those which do not die back approximately to ground level during the winter in Alabama. Most of these also display significant secondary growth, although some (e.g., *Chimaphila maculata* L., *Clematis virginiana* L.) do not. Plants excluded as herbaceous by the dieback criterion in Alabama include species of *Clematis*, *Cynanchum scoparium* Nuttall, *Cardiospermum halicacabum* L., *Menispermum canadense* L., *Dioclea multiflora* (T. & G.) Mohr, and *Calycocarpum lyoni* (Pursh) Gray.

Sixty-three of Alabama's sixty-seven counties were objects of intensive field work. Tuscaloosa, Lee, Hale, and St. Clair counties were considered in advance to have probably been well-collected by others previous to the start of this study, and they were not collected by the writer, except in sporadic fashion.

In order to augment distributional data for Alabama woody plants the following institutional herbaria were examined: University of North Carolina at Chapel Hill, University of Georgia, Vanderbilt University, University of Alabama, Auburn University, Jacksonville (Alabama) State University, Florence State University, Mississippi State University, and St. Bernard College. In addition, the Herbarium of the Geological Survey of Alabama (Mohr collection) in Tuscaloosa was examined. Data from these sources are included as distribution maps for each taxon treated.

#### EXPLORERS AND BOTANICAL COLLECTORS IN ALABAMA

Rostlund (1957) has compiled a list of the early travelers known to have journeyed through Alabama and has commented extensively upon their journals relative to the plants and vegetation they noted. Rostlund's treatment includes the commentaries of four writers with the DeSoto expedition of 1540, Dalgado's comments from southeastern Alabama in 1686, Romans' travels in western Alabama from 1771 to 1772, Swain's 1790 observations, Hawkins' 1798–1799 remarks,

as well as the statements of others. Most of these accounts appear to be of minimal value botanically, since the persons noted were not particularly interested in the plants or vegetation through which they travelled; nor were they familiar with the plants they encountered.

The first notable botanist to visit Alabama was apparently William Bartram, who travelled through southern Alabama in 1775 and 1776. Bartram described several taxa as new from Alabama and was a careful observer of the territory through which he passed. Bartram (1791) contains excellent annotations of his observations by Francis Harper.

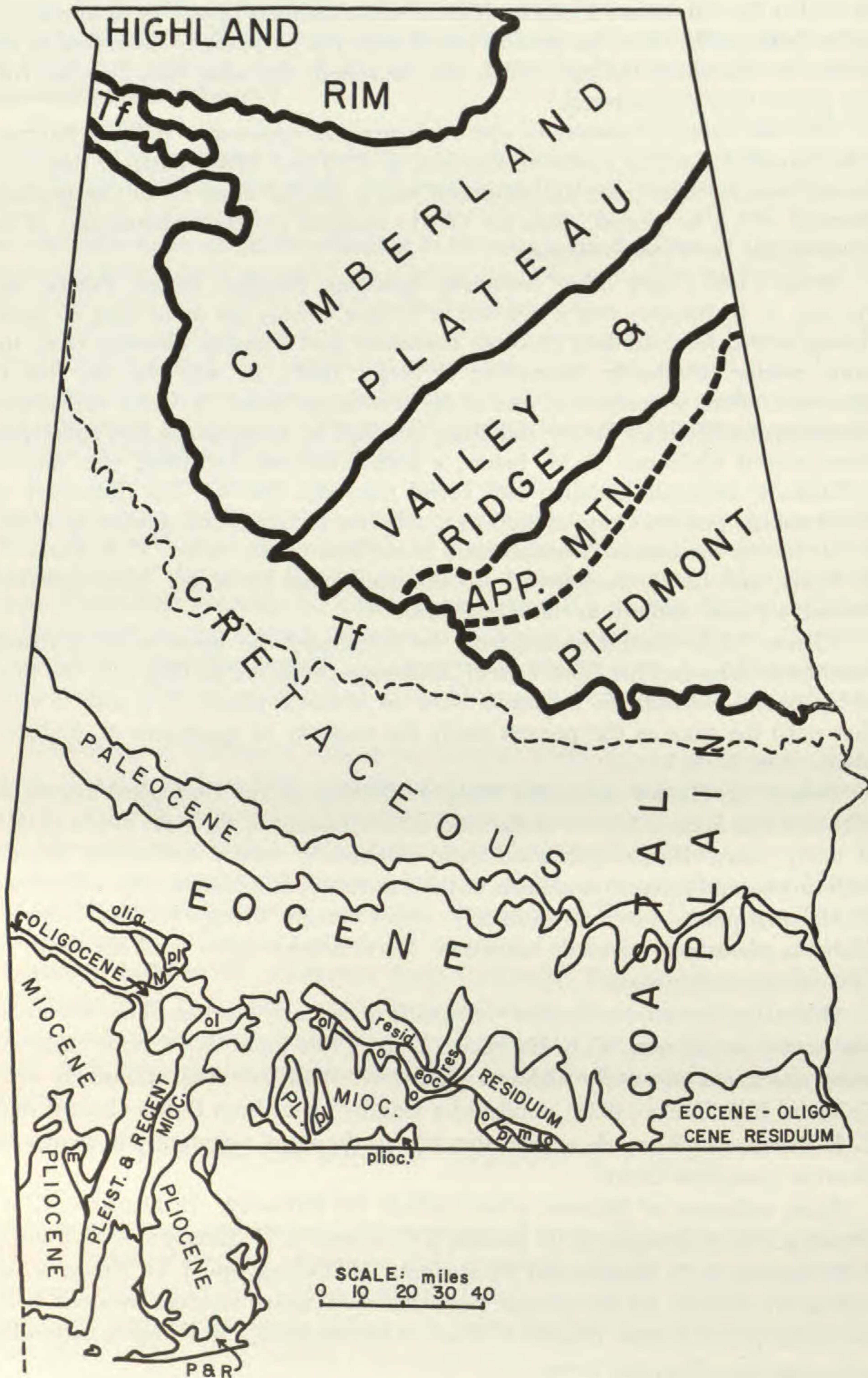
Mohr (1901) lists other botanists, including Buckley, Gates, Peters, and Nevius. S. B. Buckley was a resident of Wilcox County for more than 25 years, during which he described *Quercus shumardii* and *Quercus durandii* from the same county. Evidently (according to Mohr, 1901), he was also the first to discover *Cotinus obovatus* Raf. east of the Mississippi River. H. Gates' collections, which were utilized by Torrey and Gray, are cited by Mohr as the first collections from coastal Alabama. T. M. Peters, a noted Alabama legislator, was also an enthusiastic amateur botanist with broad interests. He was the discoverer of *Trichomanes petersii* Gray, as well as a collector of *Carex* and advisor to Mohr. R. D. Nevius discovered *Neviusia* near Tuscaloosa in the 1850's. F. S. Earle, C. F. Baker, and L. M. Underwood are also mentioned by Mohr. They collected extensively near Auburn in the late 1890's.

Charles Mohr should undoubtedly be considered the pre-eminent Alabama botanist to date, and his *Plant Life of Alabama*—published in 1901 near the time of his death—remains the definitive work on Alabama plants. It is safe to state that until the time of the present study the majority of specimens of Alabama plants were Mohr's.

Roland M. Harper succeeded Mohr as Botanist of the Geological Survey of Alabama and became known as the most active botanist in the state over a period of many years. Harper published quite extensively, mostly concerning himself with rarities and interesting aspects of the vegetation of Alabama. His collections of Alabama plants were, unfortunately, rather meagre, though his knowledge of Alabama plants was certainly extensive. He remained active until his death in 1966 at age eighty-seven.

Other significant contributions were made in the early portions of the twentieth century by several men. T. G. Harbison (1902a, 1902b) and W. W. Ashe collected many specimens of woody Alabama plants; W. Wolf collected extensively near Cullman; R. S. Cocks (1925) published a lengthy paper from Dallas County; and E. J. Palmer (1932) made a collecting trip to the state, apparently in search of *Quercus georgiana* Curtis.

Later collectors of Alabama plants include the following: D. Demaree, C. E. Wood, Jr., W. H. Duncan, J. W. Hardin, J. C. Avery, L. H. Shinnors, S. McDaniel, P. E. Bostick, J. T. Thomas and his students, M. Lelong, and J. D. Freeman, as well as the writer. At the present time, the most active resident amateur field botanist is probably Mrs. Blanche E. Dean of Birmingham, a well-known naturalist and authoress of several books.



Field work toward a comprehensive flora of the state has been in progress since 1967 by R. Kral and associates of Vanderbilt University.

### GEOLOGY

Alabama is geologically quite diverse. Besides a complete representation of the Appalachian system (Cumberland Plateau, Valley and Ridge, Appalachian Mountain, Piedmont Provinces), Alabama displays the most highly diversified exposure of the Gulf Coastal Plain outside of that portion complicated by Mississippi Embayment strata. Figure 1 illustrates the relationships of the major Provinces, which are discussed below.

#### THE HIGHLAND RIM

The Highland Rim area of extreme northern Alabama is a southernmost portion of the Interior Low Plateaux Province. Throughout most of its extent in Alabama it is characterized by extensive exposure of Tuscumbia limestone and Fort Payne chert (of upper Mississippian age). Exceptions to this characterization occur when major streams (the Elk River, for instance) expose strata of greater age. Maximal elevations on the Highland Rim are in the vicinity of 900 feet above sea level near the Tennessee border, and decline to 500–600 feet above sea level near the Tennessee River. Most of the province approximates 700 feet above sea level, while the surfaces of Hartselle sandstone "mountains" south of the Tennessee River occasionally are 50 feet higher.

Current erosion to the base level of the province is perhaps illustrated by such areas as Newsome Sinks in Alabama and Sinking Cove in Tennessee, where large areas of the Cumberland Plateau have slumped due to subterranean solution of limestones. These areas seem to tend toward a new base level approximating that of the Highland Rim. Extensive exposures of Tuscumbia limestone also occur into Jackson County along the Tennessee and Paint Rock Rivers (Stose, 1926). In extreme northwestern Alabama, the Tuscumbia limestone is often overlain by mixed, unconsolidated deposits of the Tuscaloosa formation.

Topography on the Highland Rim is generally flat to rolling, with rather frequent evidence of subsurface solution, such as dolines. The entire Alabama portion of the province is within the Tennessee River watershed and most is cultivated. The Tennessee emerges into the southeasternmost portion of the Alabama Highland Rim, as a result of a westward turn from the Sequatchie Valley, and flows westward across northern Alabama.

Together with the Cumberland Plateau and the southern Appalachian Mountains, the Interior Low Plateau forms the oldest unglaciated and exposed area in the eastern United States.

Areas where extensive exposed outcrops of Tuscumbia limestone occur are characterized by the development of cedar barrens (Quarterman, 1950), a unique vegetation type.

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FIGURE 1. Alabama showing geologic provinces and ages of Coastal Plain sediments. Base map and data modified from treatments of Fenneman (1938), Stose (1926) and MacNeil (1946, 1947). Tf = Tuscaloosa formation.

## THE CUMBERLAND PLATEAU

The Cumberland Plateau is the southern extension of the Appalachian Plateaux Province (or Allegheny Plateau). This plateau (and its outliers) occupies all of north-central Alabama, where major portions of it are locally known as Sand, Lookout, and Brindley Mountains. Northwestwardly, it is bounded by the Highland Rim, and eastwardly by the Valley and Ridge Province. Westward and southward, Plateau strata are gradually buried by the Tuscaloosa formation of the Coastal Plain. The Plateau surface is composed of Pennsylvanian strata of the Pottsville formation, which include significant shale members and coal-bearing strata (the "Coal Measures").

The surface of the Cumberland Plateau declines in elevation southward. Elevations of Plateau uplands near the Tennessee border reach 1900 feet, declining to only 500 or so feet above sea level in the vicinity of Tuscaloosa.

The eroded Sequatchie anticline (Sequatchie Valley) is a striking contrast to the Plateau surface in northeastern Alabama and is evidently related orogenically to Wills Valley. Both valleys once probably were represented by a range of mountains whose rocks—being less resistant than those of the Plateau proper—were more rapidly eroded. Both of these anticlines apparently were formed by the same forces responsible for folding the Valley and Ridge Province (Fenneman, 1938). For most of its length, the Sequatchie Valley of Alabama constitutes a pathway for the Tennessee River. The River leaves the Valley near Guntersville to complete its two-stage traverse through the Plateau, the first stage of which began at Chattanooga. Why the Tennessee cuts through the Cumberland Plateau instead of remaining in the Valley and Ridge Province has been the subject of much discussion (G. I. Adams, 1928; Fenneman, 1938).

In northeastern Alabama, the Cumberland Plateau is within the drainage of the Tennessee River. The southeastern part of the Plateau (Lookout Mountain and Wills Valley) is ultimately drained by the Coosa River. The remainder of the Plateau is drained by major streams arising on its own surface and flowing south- and westward, the Black Warrior and its several major tributaries being the principal agents. Hence, the western portion of the Plateau in Alabama is within the Tombigbee River drainage. The Black Warrior system, particularly, displays many entrenched meanders, suggesting possible uplift of an older stream system. Exactly when this may have taken place is not known, but it is thought to have occurred also in related areas, particularly the Tennessee Highland Rim (Fenneman, 1938).

Topography on the Cumberland Plateau is rolling in interstream areas. Its surface is submaturely dissected by young valleys which become more entrenched toward the edges of the province. Southward, the old peneplain surface (Schooley) becomes increasingly eroded, resulting in rougher terrain and the virtual disappearance of flat uplands (Fenneman, 1938).

Though the relatively shallow and much-eroded soils of the Plateau are not especially favorable for agriculture, large areas are cultivated or grazed, particularly in the area from Fort Payne to Cullman. The relative sterility of the soil is partially compensated for (for some crops) by its texture and the relatively cool summer nights and high rainfall on the Plateau surface.

The Appalachian plateaux (south of the glacial moraines) have evidently been continually exposed since at least early Tertiary and thus have been available to terrestrial plants for an extremely long period of time.

#### THE VALLEY AND RIDGE

The Valley and Ridge Province occurs between the Appalachian Plateaux and Appalachian Mountains Provinces and is orogenically related to both of them. In Alabama this relationship is accentuated because of the narrow width of the province relative to the extensiveness of the outlier ridges. In fact, as Fenneman (1938) points out, the Lookout Mountain portion of the Cumberland Plateau could easily be considered as being in the Valley and Ridge, except that its inclusion is awkward because of its extensiveness. The broad ridges forming the so-called Cahaba "coal field" and Coosa "coal field" are massive Cumberland Plateau outliers usually considered to be part of the Valley and Ridge in spite of their expanse. Examples of prominent outliers from the Alabama Appalachian Mountain Province are Coldwater and Choccolocco Mountains in Calhoun County.

Elevations of the Cumberland Plateau outliers approximate 1500 feet above sea level, while that of peaks in the Choccolocco Mountains may approach 500 feet higher. Base level elevations near the Coosa River are generally 500-600 feet above sea level.

The valley floors of the Valley and Ridge in Alabama are underlain at the surface by Paleozoic sediments (mostly Cambrian and Ordovician) which, as Fenneman (1938) has pointed out, represent the base level of the current peneplanation cycle (Coosa or Harrisburg). The structure of the ridge outliers, of course, reflects their relationships to either the Cumberland Plateau to the west or the Appalachian ridges east of the Valley and Ridge.

This province is often known as the Coosa Valley in Georgia and Alabama, after the major river which lies within it and drains it. Numerous large limestone springs occur within the Coosa Valley, an indication of extensive phreatic cavern development in the valley sides and floor. Topography in the Alabama Valley and Ridge has been conditioned by erosion, faulting, and extensive exposure of less resistant rocks. Soils are moderately deep, generally circumneutral, and quite fertile, and they are thus extensively farmed.

As they approach the Fall Line, the Appalachian Mountain and Valley and Ridge Provinces become more indistinct and apparently very difficult to separate. The former province seems to degenerate into lower and less discrete complexes of ranges. The Coosa River appears to cut its way through these toward the Piedmont. As it nears the Fall Line at Wetumpka, most of the rocks in the river bed seem to be schistose and slate-like, not at all resembling those typical of lower elevations in the Coosa Valley proper. On the other hand, extensive areas of limestone in the southern valley floor have been partially metamorphosed, so that marble is quarried near Talladega and Sylacauga. Metamorphosed limestone is exposed as far south as the Fall Line in Bibb County. For these reasons, it is evident that province boundaries are obscured in this general area. Possibly, the Rebecca Mountains and associated lower ridge systems represent the roots of a once much higher and more well-defined system subject to greater erosional stress

because of proximity to the ancient sea-land interface. It is thought (G. I. Adams, 1928) that the Tuscaloosa formation once extended much farther inland in some places than it does presently. If these facts are indeed valid, it would seem rather likely that (probable) frequent or prolonged marine transgression of the lower portions of the Appalachian system could easily have rendered them indistinct and confusing to observers in the present. It is also generally thought by geologists that the identical spatial arrangement of the valley, mountain and plateau provinces in Arkansas possibly indicates their homology with the Appalachian system, although proof of this possibility has been elusive.

#### THE APPALACHIAN MOUNTAINS

The Alabama Valley and Ridge Province is bounded eastward by a series of high ridges, the Talladega and Horseblock ranges. These ranges are quite similar in several ways to the ranges bordering the Great Valley farther north, *i.e.* the Unakas, and average over 1500 feet above sea level in Alabama. It is readily discernible from examination of topographic maps that the topography of these ranges resembles much more closely that of the Unakas and Blue Ridge than that of the Piedmont Province. Furthermore, geological examination indicates a closer relationship to the Unakas or Blue Ridge than to the Piedmont. At least one structural component, the Brevard schist, is common to the Blue Ridge and Talladega ranges, and in addition the Talladega Mountains appear to lie along the same axis as the Great Smokies. Even though he does not formally recognize a "Blue Ridge" province in Alabama, Fenneman (1938: 165) states that: "These low ridges represent what would have been a continuation of the mountain range had the uplift been greater and the expansion of the newer peneplain less easy." Since the Appalachian and Cumberland uplifts are thought to have been less pronounced toward the south, it is logical that the Talladega and Rebecca Mountains would be of lower relief than their northern counterparts. Even so, the highest point in Alabama occurs within this range (Mt. Cheaha, 2407 feet). The primary problem in recognizing the equivalence of the Alabama ranges and those to its northeast is the discontinuity which exists in western Georgia. In that area, the Valley and Ridge Province appears to border directly on the Piedmont (Dug-down Mountain area). But following the lines of reasoning reiterated here, the present writer believes that there is ample evidence for the formal recognition of the Appalachian mountains as a physiographic entity in Alabama. Due to the discontinuity in Georgia, the term Appalachian Mountain Province would seem to be more appropriate than a more specific name for the region, such as the "Blue Ridge."

The western slopes and southern extremity of the province are drained by tributaries of the Coosa River, while most of the eastern slopes are in the Tallapoosa River watershed. Due to the extremely steep slopes and shallow soils, only a modicum of marginal cultivation exists, and most areas are presently repeatedly cut over for pulpwood.

The structural units of this province are quite complex, consisting of metamorphics: schists, gneisses, slates, quartzites, marbles, *etc.* Certain of these rocks are as old as Precambrian.



## THE PIEDMONT

The Piedmont is the presently nonmountainous portion of the "Old Appalachian" land area. It is underlain throughout in Alabama by quite resistant rocks and is bounded northward by the closely related Appalachian Mountain Province.

The Piedmont is often spoken of as the Piedmont Plateau and, indeed, throughout most of its extent it displays topographic features one would expect on an older peneplain now undergoing dissection. This dissection is more pronounced in the vicinity of the Fall Line than it is farther into the province. As a whole, the predominant slope of the Piedmont as a province or a plateau is toward the south (in Alabama).

Elevations in the Alabama Piedmont range from about 1000 feet above sea level in the upper portion of the province, to 500–700 feet above sea level near the Fall Line zone. Monadnocks in the upper Piedmont (Turkey Heaven and Oak Mountains, for examples) are several hundred feet higher than their surroundings.

The Fall Line constitutes the southern boundary of the Piedmont, which probably occurred somewhat farther inland prior to erosion of the Coastal Plain sediments from the more inland provinces (Fenneman, 1938; G. I. Adams, 1928). The Fall Line has been interpreted as a portion of a re-exposed ancient peneplain, joining the Piedmont peneplain along the top of the present Fall Line (Fenneman, 1938).

Topography in the Piedmont is generally rolling, with few prominent structural exceptions. Drainage of the Alabama Piedmont takes place through tributaries of the Chattahoochee and Tallapoosa Rivers. Triassic lowlands are missing in the Alabama Piedmont.

Ubiquitous slopes and the primitive agricultural practices of the early white settlers combined long ago to strip the Piedmont of its topsoil. As a result, the subsoil has been farmed successfully only by repeated heavy applications of inorganic fertilizers (Fenneman, 1938).

## THE COASTAL PLAIN

The Coastal Plain of Alabama constitutes well over half the surface area of the state. Geologically, it seems quite without rival in its complexity, throughout the non-peninsular Southeast. It is composed principally of unconsolidated sediments of Cretaceous age and younger, although significant consolidated sediments do occur. Comments by the present writer have largely been conditioned by Stose (1928), Fenneman (1938), and MacNeil (1946).

As may be seen from Figure 1, the boundary delimiting the Coastal Plain from the more northern provinces in Alabama is generally quite irregular. This is particularly so at the Coastal Plain-Cumberland Plateau interface, where the Tuscaloosa formation of the Coastal Plain is higher in altitude than the plateau surface. This is fairly impressive, since the Cumberland Plateau is the highest extensive surface in the state, averaging some 500 feet or more higher than the Highland Rim or Valley and Ridge Provinces. Coastal Plain sediments attain maximal elevations of about 1000 feet above sea level in the vicinity of Phil

Campbell. In this area the strange experience can be had of descending from Coastal Plain onto the Cumberland Plateau or climbing up onto the Coastal Plain from the Cumberland Plateau.

As intimated above, the oldest Coastal Plain deposit is the Tuscaloosa formation, which is upper Cretaceous. It probably extended somewhat farther inland at one time but has been easily eroded, due to its unconsolidated character. Other extensive Cretaceous formations are exposed seaward from the Tuscaloosa formation—the Eutaw formation, Selma Chalk, and the Ripley formation. The exposed portions of the Tuscaloosa formation in Alabama contain a larger proportion of clays and gravels than the formation generally displays in eastern Georgia and the Carolinas (at least on its exposed surfaces). Parts of the Alabama Tuscaloosa formation, however, are known to overlie extensive sands, and a few areas of deep sand deposits are exposed in Russell County (extreme eastern Alabama). The Cretaceous formations were once probably covered by more recent sediments known as the Lafayette formation, which is now mostly eroded away.

Overlying the Tuscaloosa formation are two other Cretaceous formations, the Eutaw formation and the Selma Chalk. The Eutaw resembles the Tuscaloosa to rather high degree, being also somewhat sandy and poorly consolidated but of generally lower relief. Areas underlain by Selma Chalk form the widely known Black Belt, containing some of the most desirable agricultural land in the state. Soils developing over Selma Chalk are generally deep and quite dark, resembling the soils of the Prairie Peninsula and tall grass prairies of the Midwest. Black Belt topography is gently rolling. The original vegetation over Selma Chalk is not known for certain, although there seems to be good probability that portions of it were prairie-like. Aspects of this problem are mentioned further under "Alabama Vegetation, an Annotated Catalogue" (below).

There is evidently no concensus regarding the presence of Paleocene deposits outcropping in Alabama, as MacNeil (1946) indicates them and Fenneman (1938) does not.

The base of the Eocene deposits of Alabama form a cuesta, the Ripley, and south of the Ripley the Eocene strata (Clayton and Wilcox members) form a recognizable subprovince called the Red Hills.

It appears that the farther south one goes in the Alabama Coastal Plain, the less the geology is understood or agreed upon. The Hatchetigbee anticline in Choctaw and Clarke counties has been of perennial interest to geologists because of its magnitude as a Coastal Plain structure. This is apparently associated with another cuesta, the Buhrstone, on its inner side. MacNeil's (1946) treatment of the limestone-underlain areas in southeastern Alabama (which are closely related to Florida's lime sink region or the Dougherty Plain of Georgia) is at striking variance with Fenneman's (1938). The areas mapped as Ocala limestone by Stose and associates (1926) appear to have been remapped by MacNeil (1946) as Oligocene limestones in western Alabama and as "residuum" in southeastern Alabama (see Figure 1, which follows MacNeil's treatment). The residual character is attributed by MacNeil to the slumping and mixing of Miocene sandstones and sands, subsequent to the solution of underlying Chickasawhay (Oligocene) and Ocala (Eocene) limestones.

Most of the area south of the Red Hills was mapped by MacNeil as being of Miocene and Pliocene age. The Pliocene formations (Citronelle) have become of great interest in petroleum prospecting, and several oil fields have been established during the past few years.

The Mobile delta and extreme coastal Alabama are considered to be Quaternary in age. For further geological insight into this area, the reader is referred to Carlston (1950).

Much of the Alabama Coastal Plain is drained by the three major rivers with headwaters outside the province—the Alabama, Tombigbee and Chattahoochee. However, two sizeable rivers, the Choctawhatchee and the Conecuh, arise on the Eocene of southeastern Alabama and drain that region. The Ripley cuesta, incidentally, is rather clearly indicated by the headwaters of many south-flowing streams, particularly in eastern Alabama.

#### ALABAMA SOILS

Due to great geological diversity, there is also notable variety in substrata and, consequently, in soils of Alabama. The following remarks regarding the principal soils (Soil Associations) of Alabama are based on the treatments in *Soils and Men* (United States Department of Agriculture, 1938).

Soils of the Dickson-Baxter Association characterize the inner Highland Rim of extreme northern Alabama. These (red-yellow podzolic) soils are derived from deposits of massive dolomites and limestones, with frequent cherty elements. Compaction or weak hardpan formation is not uncommon in Dickson-Baxter soils, which are also relatively deep, fertile and circumneutral in reaction. Land usage on these soils varies from timber production to diversified agriculture.

The Cumberland Plateau area of northern Alabama is overlain by Hartsells-Muskingum soils, which may be represented as gray-brown podzolic lithosols, underlain by sandstones and shales. These soils are usually shallow, extremely well-drained, inherently low in fertility and often extremely rocky, but are quite productive when supplemented with fertilizers.

Soils of the Decatur-Dewey-Clarksville Association (red-yellow podzols) are characteristic of the outer Highland Rim and the Coosa Valley (Valley and Ridge Province) of the state. Karst conditions are usually a prominent factor in subsurface drainage in these soils, which have generally developed over limestones, dolomites, cherts and shales. These soils are correspondingly diverse, and vary in fertility, the most productive being those derived from calcareous substrata. Diversified agriculture, including much cotton production, is presently accomplished on these soils.

Talladega-Fannin soils (red-yellow podzolic lithosols) overlie the southernmost portions of the Appalachian Mountain Province. Parent materials are metamorphics, including schists, micas, and quartz. These soils are predominantly rocky and severely eroded, and support subsistence agriculture and successively poorer timber yields.

The Piedmont Province of Alabama is overlain by soils of the Cecil-Applying Association (red-yellow podzolic). These soils were apparently quite fertile before excessive erosion took a heavy toll. Diversified agriculture is still supported in

this area through continued application of chemical fertilizers. Underlying substrata are igneous or metamorphic and usually acid, consisting primarily of granites, gneisses and schists. Soils in some parts of the Piedmont are derived from more mafic rocks, which characteristically give rise to Davidson-Mecklenburg-Iredell soils (Alabama Department of Agriculture and Industries, 1953).

The Cretaceous Black Belt area of central Alabama is typified by Sumter-Vaiden soils (rendzina); the parent material is Selma Chalk (marl). These soils are clayey and heavy, sticky when wet and hard when dry. High temperatures and relatively low summer rainfall, coupled with soil conditions, lead to characteristic annual drought situations in the upland areas of the Black Belt. A preponderance of the acreage is now in pasture. Incidentally, this area of the state was apparently named for the predominant color of its soils, and not of its human populational majority, as has sometimes mistakenly been maintained.

The Red Hills and Tuscaloosa formation have given rise to Susquehanna-Savannah-Ruston and Norfolk-Ruston soils (red-yellow podzols) characterized by red to gray surface soils and red subsoils. These soils have developed over largely unconsolidated materials and vary from each other chiefly in texture. Some of the Red Hills soils appear to be derived from calcareous clays and marls. Norfolk Sand is rare in Alabama, although isolated occurrences have been reported (K. E. Landers, personal communication, 1967).

Greenville-Magnolia soils (red-yellow podzols) overlie a portion of extreme southeastern Alabama. These soils are typically deeper than other Red Hills soils and possess greater percentages of fine materials throughout their profiles. Erosion has proceeded quite severely in these soils, a notable example being the "Little Grand Canyon" of southwestern Georgia. These and soils of the preceding Associations support varied agricultural activities.

Extreme southern Alabama (Holocene) is characterized by water related soils such as Leon-Bladen, which are predominantly ground water podzols. Many soils in this Association commonly display an organic hardpan and are mediacid to strongly acid. In Alabama, these soils have remained largely wooded; much of this area is also swampy.

Significant alluvial deposits occur along the channels and terraces of the major rivers. These areas are usually timbered, except in the Tennessee Valley, where extensive flood control has rendered flood risk negligible, and the areas are thus safe for farming.

For more detailed information concerning the extent of Soil Associations and Series in Alabama, the reader is referred to Alabama Department of Agriculture and Industries (1953) and to soil surveys of individual counties.

#### CLIMATE

Annual mean temperatures measured in Alabama range from just under 60° F on the northern Cumberland Plateau to more than 67° F near the Gulf of Mexico (United States Department of Agriculture, 1941; United States Department of Commerce, n. d.). Absolute temperature minima range from near -20° F (northern Plateau) to just over 0° F (Gulf coast), while record maxima range between 100° F and 110° F over the state. Lowest temperatures generally occur from

TABLE 1. Summary of climatological data from selected stations in the major geological divisions of Alabama. Temperatures are in °F; precipitation in inches. See section on "Climate" for detailed localities of the stations.

Station	Month												Average or extreme	Mean frost-free season (days)
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Decatur (22) <sup>a</sup>	51.6	53.4	63.7	73.2	82.0	89.1	91.4	90.2	85.5	74.1	62.1	52.2	72.4	220
St. Bernard (22)	54.5	56.8	64.5	73.4	81.9	89.3	90.2	89.7	85.2	76.3	62.9	54.4	73.3	198
Talladega (21)	56.6	58.6	67.6	75.4	83.5	90.0	91.8	91.3	87.3	76.7	65.6	56.2	75.0	216
Auburn (22)	59.8	61.6	67.9	75.3	84.1	90.7	90.9	90.3	86.9	79.4	67.1	59.5	76.1	229
Troy (20)	61.1	63.0	69.4	77.0	85.3	91.3	91.3	90.8	87.3	79.4	67.7	61.1	77.1	244
Bay Minette (14)	65.2	67.2	71.5	78.5	85.6	90.8	90.9	91.4	87.4	81.1	71.3	65.5	78.9	292
	Mean maximum temperature													
Decatur (22)	35.6	36.1	42.3	51.0	60.0	68.4	71.0	70.2	64.0	52.4	41.5	36.2	52.4	52.4
St. Bernard (20)	33.1	33.8	39.6	47.4	55.8	64.3	67.3	66.4	60.2	48.6	37.6	32.9	48.9	48.9
Talladega (20)	36.8	37.0	42.6	49.7	57.9	66.1	68.8	68.0	62.5	50.7	40.5	36.2	51.4	51.4
Auburn (22)	39.7	40.0	45.2	52.1	60.2	67.7	69.8	69.2	64.7	54.7	44.0	39.1	53.9	53.9
Troy (20)	41.0	41.9	46.8	53.5	61.2	68.0	69.9	69.2	64.9	54.8	44.2	40.8	54.7	54.7
Bay Minette (14)	43.8	44.8	49.9	55.6	64.0	70.2	71.7	71.8	67.4	56.8	46.9	43.4	57.2	57.2
	Mean minimum temperature													
Decatur (22)	78	80	88	91	99	107	106	107	103	97	86	78	107	107
St. Bernard (21)	79	79	85	90	96	103	110	105	102	93	86	80	110	110
Talladega (21)	80	81	88	97	98	109	107	107	103	96	86	80	109	109
Auburn (21)	81	81	89	94	98	107	106	104	100	96	90	80	107	107
Troy (20)	83	83	88	94	99	105	107	104	101	95	89	81	107	107
Bay Minette (14)	85	82	89	94	100	102	103	101	98	93	88	82	103	103
	Highest temperature													
Decatur (22)	-3	3	12	26	39	51	52	54	40	28	3	10	-3	-3
St. Bernard (20)	-16	-7	10	23	34	44	50	49	37	23	2	4	-16	-16
Talladega (20)	-5	2	10	25	35	45	51	46	39	23	5	9	-5	-5
Auburn (22)	7	9	13	27	37	51	57	56	42	25	9	13	7	7
Troy (20)	10	10	19	29	39	55	59	55	44	28	12	14	10	10
Bay Minette (14)	14	10	18	34	45	54	58	60	45	32	19	18	10	10
	Lowest temperature													
Decatur (22)	5.93	5.50	6.08	4.29	3.04	3.34	4.53	3.88	3.01	2.41	3.95	5.03	50.99	50.99
St. Bernard (21+)	5.71	5.78	6.21	4.27	3.16	3.80	5.06	4.40	2.75	3.41	4.11	5.42	54.08	54.08
Talladega (22)	4.66	5.47	6.56	4.66	3.39	4.49	5.11	4.50	2.71	2.64	3.16	5.17	52.52	52.52
Auburn (22)	4.62	4.84	6.79	4.92	3.45	3.77	5.04	5.05	3.28	1.99	3.57	5.08	52.40	52.40
Troy (21+)	4.90	4.37	7.27	5.58	3.97	3.31	6.13	6.18	3.69	1.56	3.56	4.84	55.36	55.36
Bay Minette (16+)	5.15	3.96	8.45	6.23	5.23	4.91	8.72	6.34	6.26	2.60	3.89	5.02	66.76	66.76

<sup>a</sup> Numbers of years on which records are based are given in parentheses.

December through February, while highs for the year usually occur in June through August. Proximity to the Gulf coast exerts a moderating effect on temperature extremes and heightens annual precipitation totals.

Annual mean precipitation is generally 50 or more inches statewide, approaching 70 inches near the Gulf coast and 55 inches on the Cumberland Plateau. Two peaks of precipitation are discernible, occurring in March and July. There is some tendency for the early spring peak to be more sustained inland, whereas the summer peak becomes much more accentuated toward the Gulf of Mexico. This latter phenomenon appears to be due primarily not to periods of heavy precipitation associated with tropical storms, but owes its occurrence to diurnal shower activity along the coast.

During the seasons of most active air mass movement, one of the principal breeding areas for cyclonic disturbances is in the northern Gulf of Mexico. Precipitation patterns in southern Alabama are influenced by this factor. Also, topography of the Appalachian System in northern Alabama acts as an effective orographic trigger, resulting in higher precipitation totals there than in the interior lowlands.

Table 1 is a sampling of climatological data from selected stations in the major geological divisions of the state. Decatur is in the Highland Rim Province, St. Bernard on the Cumberland Plateau, Talladega in the Valley and Ridge, Auburn on the Piedmont, Troy in the mid-Coastal Plain, and Bay Minette is on the lower Coastal Plain (near Mobile) not far from the Gulf coast.

#### ALABAMA VEGETATION, AN ANNOTATED CATALOGUE

Among the portrayers of the vegetation of areas including Alabama are Harshberger (1911), Shantz and Zon (1924), Weaver and Clements (1938), Braun (1950), Kuchler (1964), and Knapp (1965). Of these treatments, Knapp appears to have arrived closest to the actual situation in the categories of vegetation he represents as well as their spatial extents and relationships to each other. It is worth noting, however, that Knapp's concepts appear to represent essentially those of Braun as modified by Kuchler.

#### MAJOR CATEGORIES OF ALABAMA VEGETATION

- Eastern Deciduous Forest
  - Mixed mesophytic forest
  - Oak-hickory forest complex
- Coastal Plain Mixed Forest
  - Southern mixed forest
  - Swamp forest complex
- Prairie-Forest Mosaic
- Southeastern Coniferous Forest
  - Pine-oak forest
  - Pine-oak savanna
- Maritime Strand Complex

In spite of the limitations inherent in treating the vegetation in an area the size of Alabama, it seems appropriate to draft an original portrayal of the major vegetational types of Alabama (see Figure 2). The treatment presented here is, of course, based largely on the prior interpretations of previous workers and

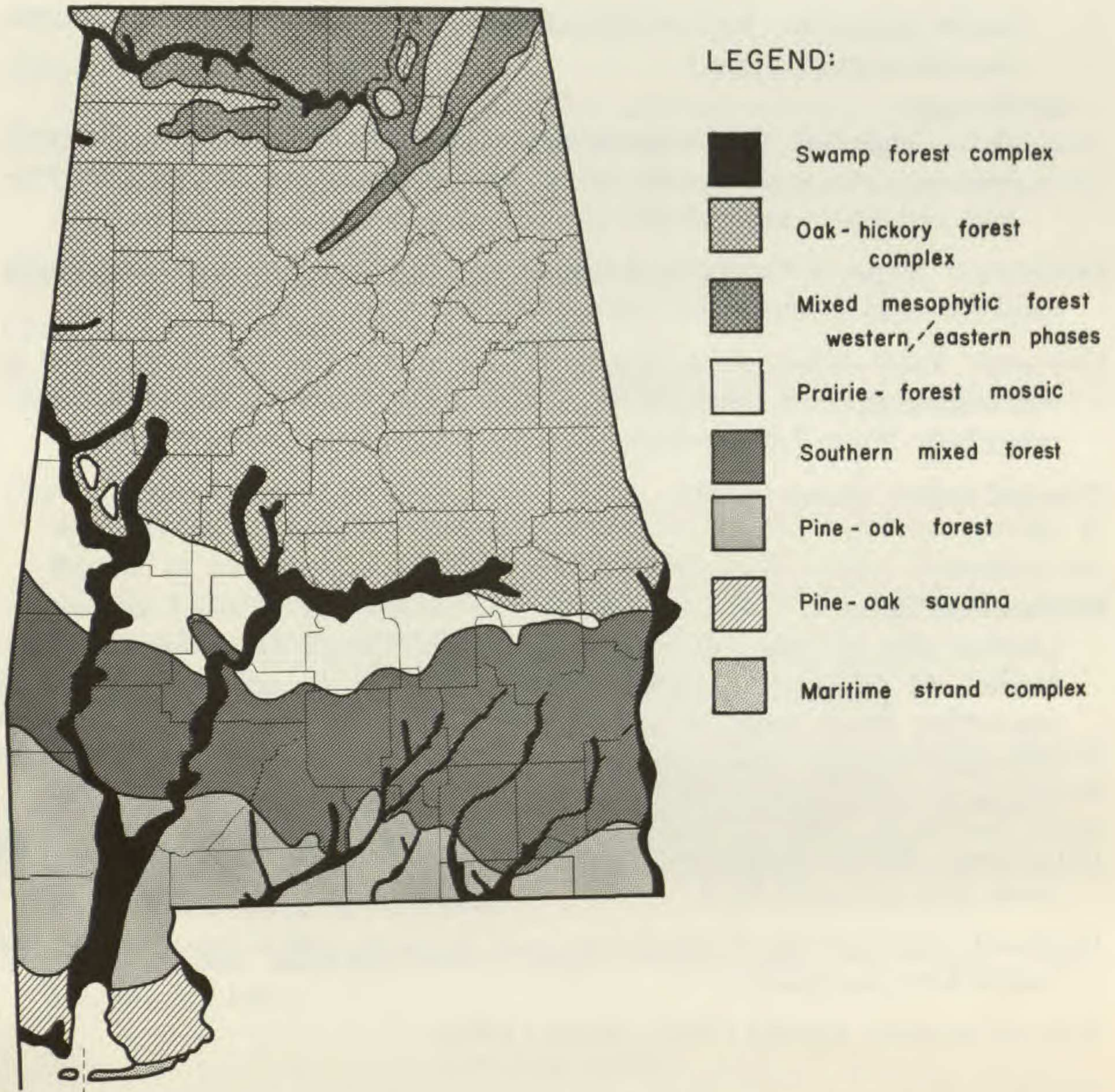


FIGURE 2. Estimated potential natural vegetation of Alabama.

represents an attempt to integrate these treatments with the extensive and detailed field experience accumulated during this study.

The following is an annotated catalogue of noteworthy vegetational types in Alabama, together with references indicating the treatments which have been most influential in guiding the present synthesis.

#### MIXED MESOPHYTIC FOREST

##### Characteristic taxa:

##### Woody:

*Quercus alba*, *Q. rubra*, *Q. muehlenbergii*, *Ulmus rubra*, *U. americana*, *U. serotina*, *Carya ovata*, *Fraxinus americana* subsp., *Castanea dentata* (formerly), *Robinia pseudo-acacia*, *Acer saccharum* subsp., *A. rubrum*, *Nyssa sylvatica*, *Liquidambar styraciflua*, *Tilia americana* sens. lat., *Fagus grandifolia*, *Magnolia acuminata*, *Liriodendron tulipifera*, *Aristolochia tomentosa*,

*Smilax tamnoides*, *Juglans cinerea*, *J. nigra*. (*Betula*, *Tsuga*, *Cladrastis*, *Aesculus octandra*, rare.)

Herbaceous:

Many, including *Orchis specabilis*, *Hydrophyllum canadense*, *Erigenia bulbosa*, *Pachysandra procumbens*, *Asarum canadense*, *Polemonium reptans*, and *Aplectrum hyemale*.

Occurrence: Slopes of Cumberland Plateau and Highland Rim, including southward extension of Sequatchie Valley; northeastern part of state.

Comment: Small differences in topography are mirrored by significant shifts in vegetational patterns. Here, in the southernmost portions of its range, mixed mesophytic forests become largely confined to optimal, calcareous sites.

Principal source: Braun (1950).

OAK-HICKORY FOREST

Characteristic taxa:

*Quercus alba*, *Q. rubra*, *Q. velutina*, *Q. muehlenbergii*, *Q. stellata*, *Q. marilandica*, *Q. falcata*, *Q. prinus*, *Carya cordiformis*, *C. ovata*, *Liquidambar styraciflua*, *Pinus taeda*, *P. palustris*, *P. virginiana*, *P. echinata*, *Fraxinus americana* subsp., *Nyssa sylvatica*, *Robinia pseudo-acacia*, *Castanea dentata* (formerly), *Oxydendrum arboreum*, *Ceanothus americanus*.

Occurrence: Widely distributed in northern and central parts of state, and on mesic sites in Coastal Plain.

Comment: Varies widely in composition over its range, and is sometimes termed oak-hickory-pine forest.

Principal sources: Oosting (1942), Braun (1950).

SOUTHERN MIXED FOREST

Characteristic taxa:

Canopy: *Fagus grandifolia*, *Magnolia grandiflora*, *M. acuminata*, *Quercus alba*, *Q. nigra*, *Q. falcata*, *Q. rubra*, *Q. velutina*, *Q. laurifolia*, *Carya tomentosa*, *C. glabra*, *Acer saccharum* subsp., *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Nyssa sylvatica*.

Understory: *Magnolia tripetala*, *M. macrophylla*, *Hamamelis virginiana*, *Oxydendrum arboreum*, *Illicium floridanum*, *Ilex opaca*, *Osmanthus americanus*.

Occurrence: Ravines in Red Hills, Lime Hills and Marl regions (the latter two of Harper, 1928) in southern part of state; also ravines bordering floodplains of larger streams of Coastal Plain. Higher elevations throughout its range are typically occupied by (less mesic) oak-hickory or pine-oak forest.

Comment: Most of the dominants point to a strong relationship between these forests and (ancestral?) mixed mesophytic forests.

Principal sources: Monk (1965), Quarterman and Keever (1962).



## SWAMP FOREST

## Characteristic taxa:

*Taxodium distichum*, *Nyssa sylvatica*, *N. aquatica*, *Quercus prinus*, *Q. lyrata*, *Q. phellos*, *Carya aquatica*, *Populus deltoides*, *Platanus occidentalis*, *Carpinus caroliniana*, *Planera aquatica*, *Forestiera acuminata*, *Brunnichia ovata*, *Sabal minor*, *Sebastiania ligustrina*.

Occurrence: Along major streams in the Coastal Plain.

Comment: Habitat preferences are complex.

Principal sources: Harper (1907), Penfound (1952).

## PRAIRIE-FOREST MOSAIC

## Characteristic taxa:

*Andropogon scoparius*, *A. gerardii*, *Sorghastrum nutans*, *Quercus stellata*, *Q. falcata*, *Q. marilandica*, *Q. durandii*, *Q. macrocarpa* (rare), *Juniperus virginiana*, *Liquidambar styraciflua*, *Ulmus alata*, *Carya* spp., and other typical prairie and prairie-forest border taxa.

Occurrence: Central part of state, from Sumter to Russell counties.

Comment: The source of perennial interest and debate as a putative disjunct from the main body of tall grass prairie; its original aspect seems to have been of patches of grassland of varying size, interspersed with oak-hickory forest. The principal geological substrate, Selma Chalk, appears to have been important in maintaining the vegetation.

Principal sources: Bartram (1791), Harper (1943), Jones and Patton (1966), Maginness (1967).

## PINE-OAK FOREST

## Characteristic taxa:

*Pinus palustris*, *Quercus laevis*, *Q. incana*, *Q. stellata* var. *margaretta*, *Q. marilandica*, *Cnidoscolus stimulosus*, *Stillingia sylvatica*, *Baptisia tinctoria*, *Stipulicida setacea*.

Occurrence: Upland sites in the Coastal Plain and adjacent provinces, principally south of the Black Belt and Red Hills.

Comment: Vegetation mapped in this category (Figure 2) has been greatly altered since settlement by Europeans. In its area of best development, the original vegetation (on upland sites) apparently consisted of extensive open forests of longleaf pine, with few other woody taxa except in areas experiencing infrequent fire. In eastern Georgia and the Carolinas, the extant range of *Pinus palustris* is usually taken to be spatially equivalent to the original forests. This correlation cannot be assumed in Alabama, since longleaf pine shows wider ecological amplitude there. Control of fire has led to higher percentages of hardwood dominants throughout the range of this vegetation type.

Principal sources: Wells (1928), Garren (1943).

## PINE-OAK SAVANNA

## Characteristic taxa:

*Pinus elliotii*, *P. palustris*, *Serenoa repens*, *Quercus virginiana*, *Q. myrtifolia*, *Myrica cerifera*, *Ilex glabra*, *Hypericum* spp., and many typical herbs.

Occurrence: Low uplands on the southernmost portions of the Coastal Plain.

Comment: Corresponds to meso-hydrophytic forest of Pessin (1933). Fire seems to be an important factor in maintaining the physiognomy and flora of this community.

Principal source: Pessin (1933).

## MARITIME STRAND

## Characteristic taxa:

*Quercus virginiana*, *Q. myrtifolia*, *Q. chapmanii*, *Pinus clausa* (east of Mobile Bay only), *Juniperus virginiana*, *Ceratiola ericoides*, *Serenoa repens*, *Ilex vomitoria*, *Uniola paniculata*, *Iva* spp., *Croton punctatus*, *Ipomoea stolonifera*, *Solidago pauciflosculosa*, *Opuntia* spp.; *Spartina alterniflora*, *Distichlis spicata*, *Juncus roemerianus*.

Occurrence: The barrier peninsulas and islands of Baldwin and Mobile counties in the extreme southern part of the state.

Comment: Three major community complexes are usually distinguished on the maritime strand of the southeastern United States, exclusive of southern Florida. These are marsh (brackish and salt), dune, and maritime forest. A canopy predominantly of *Quercus virginiana* typifies the maritime forest. The distribution of maritime forests and the various dune communities is strongly influenced by factors relating to their proximity to open salt water. All of these communities are mapped as a single complex in Figure 2.

Principal sources: Bourdeau and Oosting (1959), Kuchler (1964), Kurz (1942), Laessle (1958), Penfound (1952), Stallard (1950), Wells (1939).

## FLORISTICS

It is possible to categorize the modes of occurrence of many Alabama woody plants and—to an extent—relate their distributions within Alabama to their wider distributions. Explanations of these distributional categories follows. Sources of the data which form the bases for these generalizations are indicated in the introduction to this paper.

Taxa which may be termed as outer Coastal Plain in overall affinity occur in extreme southern Alabama. Most of these plants have centers of distribution in northern Florida and southeastern Georgia. In Alabama, most appear to be confined to sediments of Miocene age or younger. Some of these plants are widespread over these sediments, while others appear to occur only in rather restricted habitats over these substrata. Some outer Coastal Plain plants seem to be strictly

confined to even younger Pleistocene or Holocene sediments. Included in this category are the following taxa:

- |  |   |
|--|---|
| <i>Polygonella polygama</i> (Vent.) Engelm. & Gray         | <i>Chamaecyparis thyoides</i> (L.) BSP.                           |
| <i>Quercus virginiana</i> Miller                           | <i>Stillingia aquatica</i> Chapman                                |
| <i>Quercus pumila</i> Walter                               | <i>Chrysobalanus oblongifolius</i> Michaux                        |
| <i>Quercus chapmanii</i> Sargent                           | <i>Crataegus aestivalis</i> (Walter) T. & G.                      |
| <i>Quercus myrtifolia</i> Willd.                           | <i>Sageretia minutiflora</i> (Michaux) Trel.                      |
| <i>Myrica inodora</i> Bartram                              | <i>Populus heterophylla</i> L.                                    |
| <i>Taxodium distichum</i> var. <i>nutans</i> (Aiton) Sweet | <i>Cissus incisa</i> (Nuttall) Des Moulins                        |
| <i>Pinus clausa</i> (Chapman) Vasey                        | <i>Daubentonia punicea</i> (Cav.) DC.                             |
| <i>Serenoa repens</i> (Bartram) Small                      | <i>Hypericum fasciculatum</i> Lam.                                |
| <i>Smilax auriculata</i> Walter                            | <i>Hypericum cistifolium</i> Lam.                                 |
| <i>Ilex amelanchier</i> Curtis                             | <i>Hypericum suffruticosum</i> P. Adams & N. Robson               |
| <i>Ceratiola ericoides</i> Michaux                         | <i>Rhododendron viscosum</i> var. <i>serrulatum</i> (Small) Ahles |
| <i>Gaylussacia mosieri</i> Small                           | <i>Borrchia frutescens</i> (L.) DC.                               |
| <i>Kalmia hirsuta</i> Walter                               | <i>Iva frutescens</i> L.  |
| <i>Pieris phillyreifolia</i> (Hooker) DC.                  | <i>Iva imbricata</i> Walter                                       |
| <i>Vaccinium myrsinites</i> Lam.                           | <i>Viburnum obovatum</i> Walter                                   |
| <i>Conradina canescens</i> (T. & G.) Gray                  | <i>Decodon verticillatus</i> (L.) Ell.                            |
| <i>Satureja coccinea</i> (Nuttall) Benth.                  | <i>Cliftonia monophylla</i> (Lam.) Sargent                        |
| <i>Cinnamomum camphora</i> (L.) Nees & Eberm.              |   |

Several of the outer Coastal Plain plants have been of phytogeographical interest because of close relatives in the southwestern United States or in Mexico. Various interpretations have been advanced regarding the origins of plants of the eastern Gulf of Mexico area (Neill, 1957; James, 1961).

Some woody plants of Alabama appear to occur throughout the Coastal Plain and are mainly confined to that province. This category includes the following:

- |   |  |
|---|--|
| <i>Myrica cerifera</i> L.                 | <i>Pinus glabra</i> Walter                         |
| <i>Halesia diptera</i> Ellis              | <i>Persea borbonia</i> (L.) Spreng.                |
| <i>Magnolia grandiflora</i> L.            | <i>Osmanthus americanus</i> (L.) Gray              |
| <i>Brunnichia ovata</i> (Walter) Shinnars | <i>Sebastiania ligustrina</i> (Michaux) Muell-Arg. |
| <i>Ilex vomitoria</i> Aiton               | <i>Cyrilla racemiflora</i> L.                      |

In addition to those above, a substantial number of taxa of woody plants are primarily confined to the Coastal Plain but are not really widespread there, possibly due to the relatively high geological diversity of this province in Alabama. For instance, plants of *Baccharis halimifolia* L. and *Bumelia lanuginosa* (Michaux) Persoon appear to become much rarer in the western Coastal Plain in Alabama than they are eastward.

Other plants that have centers of distribution in the Coastal Plain of the

southeastern United States seem to show significant extensions into more northern provinces in Alabama. This is probably a rather common occurrence in the southeastern United States, but certification of this fact awaits more complete data from adjacent states. Plants in this grouping are listed below. Many of them display range extensions into the Highland Rim (HR) or Valley and Ridge (VR) Provinces. See the introduction to the keys to families (p. 122) for an explanation of the abbreviations.

<i>Trachelospermum difforme</i> (Walter) Gray (VR, CuP, HR)	<i>Quercus laurifolia</i> Michaux (P, CuP)
<i>Ampelopsis arborea</i> (L.) Koehne (VR, HR)	<i>Quercus lyrata</i> Walter (HR)
<i>Taxodium distichum</i> (L.) Richard (P, VR, HR)	<i>Smilax smallii</i> Morong (VR)
<i>Styrax americana</i> Lam. (P, VR)	<i>Smilax laurifolia</i> L. (VR)
<i>Sabal minor</i> (Jacquin) Persoon (VR)	<i>Pinus palustris</i> Miller (AM, CuP)
<i>Quercus stellata</i> var. <i>margaretta</i> (Ashe) Sargent (VR, CuP)	<i>Sorbus arbutifolia</i> (L.) Heynhold (CuP, AM, HR)
<i>Quercus incana</i> Bartram (CuP)	<i>Gelsemium sempervirens</i> (L.) Aiton f. (P, CuP)
<i>Magnolia virginiana</i> L. (P, VR)	<i>Nyssa aquatica</i> L. (HR, CuP)
<i>Quercus prinus</i> L. (= <i>michauxii</i> ) (HR, CuP)	<i>Carya aquatica</i> (Michaux f.) Nuttall (HR)

Quite often, it seems that these plants are those which occur in conjunction with Coastal Plain river swamps and display range extensions northward on the (calcareous) alluvial soils along the Coosa and Tennessee Rivers. This suggests that there may be some correspondence of these habitats, at least in Alabama, or that perhaps some compensating mechanisms may be operative in the northward habitats. Also suggested indirectly is the possibility that (at least) the Valley and Ridge Province might serve as a significant avenue for migration.

As one would expect, there are several plants with centers of distribution in the northeastern United States which also occur in Alabama and which tend to become confined to the Cumberland Plateau and Appalachian Mountain Provinces as they occur southward. A listing of these includes the following plants:

<i>Acer saccharum</i> ssp. <i>nigrum</i> (Mi- chaux f.) Desmarais	<i>Chimaphila maculata</i> (L.) Pursh
<i>Corylus americana</i> Walter	<i>Tsuga canadensis</i> (L.) Carr.
<i>Betula lenta</i> L.	

There is also a group of woody plants with centers of distribution in the southern Appalachians. These reach their southern limits on the same physiographic areas as those in the previous group. They include:

<i>Hypericum stragalum</i> P. Adams & N. Robson	<i>Stewartia ovata</i> (Cav.) Weatherby
<i>Pinus virginiana</i> Miller	<i>Physocarpus opulifolius</i> (L.) Maxim.
	<i>Fothergilla major</i> (Sims) Lodd

<i>Pyralia pubera</i> Michaux	<i>Hydrangea arborescens</i> subsp. <i>dis-</i>
<i>Rhododendron catawbiense</i> Michaux	<i>color</i> (Ser.) McCl.
<i>Rhododendron arborescens</i> (Pursh)	<i>Celastrus scandens</i> L.
Torrey	<i>Vaccinium pallidum</i> L.
<i>Rhododendron minus</i> Michaux	<i>Corylus cornuta</i> Marshall
<i>Diervilla sessilifolia</i> Buckley <i>sens. lat.</i>	

There is a relatively small group of woody plants which displays distributional patterns centered in the Piedmont or southernmost Appalachian Mountains (and the Ozarks, in one case). This group is here designated as of perimontane affinity and includes the following:

<i>Lonicera flava</i> Sims (also in Ozarks)	<i>Amorpha schwerini</i> Schneider
<i>Prunus serotina</i> subsp. <i>hirsuta</i> (Ell.)	<i>Rhododendron flammum</i> (Michaux)
McVaugh	Sargent
<i>Ribes curvatum</i> Small	<i>Quercus georgiana</i> Curtis

Certain plants which are characteristic of mixed mesophytic forests as defined by Braun (1950) reach southern extremes on calcareous sites in Alabama, as do mixed mesophytic forests (see section on Alabama Vegetation). These taxa characteristically display centers of distribution west of the Blue Ridge. *Aesculus octandra* Marshall is a characteristic dominant of Braun's eastern phase of mixed mesophytic forest; *Fraxinus quadrangulata* Michaux and *Ulmus serotina* Sargent show strong affinities to western phases of this forest type. *Cladrastis lutea* (Michaux f.) K. Koch is typical of both eastern and western phases of mixed mesophytic forest.

A small group of lower Southeastern woody plants with centers of occurrence in Alabama is recognizable. Among these are *Illicium floridanum* Ellis, *Hydrangea quercifolia* Bartram and *Aesculus parviflora* Walter, all highly celebrated plants.

Several of the woody plants included in this treatment represent previous escapes that have now become naturalized. Some of these have spread widely. The following list includes plants widely naturalized, but does not include incidental escapees.

<i>Carya illinoensis</i> (Wang.) K. Koch	<i>Ligustrum sinense</i> Loureiro
<i>Maclura pomifera</i> (Raf.) Schneider	<i>Pueraria lobata</i> (Willd.) Ohwi
(possibly native also)	<i>Paulownia tomentosa</i> (Thunberg)
<i>Lonicera japonica</i> Thunberg	Steudel
<i>Ailanthus altissima</i> (Miller) Swingle	<i>Albizia julibrissin</i> Durazzini
<i>Melia azedarach</i> L.	

Some woody plants of wide distribution within the eastern United States or North America apparently become less and less common southward, until they are quite rare or altogether absent near the Gulf Coast. This group includes:

<i>Quercus prinoides</i> var. <i>acuminata</i>	<i>Quercus rubra</i> L.
(Michaux) Gleason	<i>Quercus shumardii</i> Buckley
<i>Acer negundo</i> L.	<i>Quercus velutina</i> Lam.

*Oxydendrum arboreum* (L.) DC.      *Fraxinus americana* L. *sens. lat.*  
*Hydrangea arborescens* L. *sens. lat.*      *Rhus glabra* L.  
*Cercis canadensis* L.

A considerable number of native woody plants is widespread over Alabama; they probably occur in every county. These plants are also of widespread occurrence in the southeastern United States, and some are common over a wider range.

<i>Fagus grandifolia</i> Ehrhart	<i>Salix nigra</i> Marshall
<i>Quercus alba</i> L.	<i>Tilia americana</i> L.
<i>Quercus falcata</i> Michaux	<i>Ulmus alata</i> Michaux
<i>Quercus marilandica</i> Muenchh.	<i>Cocculus carolinus</i> (L.) DC.
<i>Quercus nigra</i> L.	<i>Celtis occidentalis</i> L.
<i>Quercus phellos</i> L.	<i>Vitis rotundifolia</i> L.
<i>Quercus stellata</i> Wang.	<i>Callicarpa americana</i> L.
<i>Hamamelis virginiana</i> L.	<i>Acer rubrum</i> L.
<i>Liquidambar styraciflua</i> L.	<i>Rhus copallina</i> L.
<i>Hypericum hypericoides</i> (L.) Crantz	<i>Rhus radicans</i> L.
<i>Carya tomentosa</i> (Poiret) Nuttall	<i>Ilex opaca</i> Aiton
<i>Sassafras albidum</i> (Nuttall) Nees	<i>Alnus serrulata</i> (Aiton) Willd.
<i>Smilax bona-nox</i> L.	<i>Betula nigra</i> L.
<i>Smilax glauca</i> Walter	<i>Carpinus caroliniana</i> Walter
<i>Phoradendron serotinum</i> (Raf.) Johnston	<i>Ostrya virginiana</i> (Miller) K. Koch
<i>Morus rubra</i> L.	<i>Campsis radicans</i> (L.) Seemann
<i>Nyssa sylvatica</i> Marshall	<i>Sambucus canadensis</i> L.
<i>Pinus taeda</i> L.	<i>Euonymus americanus</i> L.
<i>Platanus occidentalis</i> L.	<i>Juniperus virginiana</i> L.
<i>Arundinaria gigantea</i> (Walter) Muhl.	<i>Diospyros virginiana</i> L.
<i>Prunus angustifolia</i> Marshall	<i>Vaccinium arboreum</i> Marshall
<i>Prunus serotina</i> Ehrhart	<i>Vaccinium stamineum</i> L.
	<i>Cephalanthus occidentalis</i> L.

The most noted plants in Alabama are the rare ones, several of which are near-endemics. Alabama's interesting rarities include *Quercus macrocarpa* Michaux, *Cotinus obovatus* Raf., *Andrachne phyllanthoides* (Nuttall) Mueller, *Neviusia alabamensis* Gray, *Croton alabamensis* Smith, *Schisandra glabra* (Brickell) Rehder, *Dirca palustris* L., and *Myrica inodora* Bartram. Herbs in this category include *Oenothera grandiflora* Bartram and *Croomia pauciflora* (Nuttall) Torrey.

*Quercus macrocarpa* is associated with oak-parkland (or "prairie") vegetation in Alabama, as it is in the midwestern United States. A single population is known in Alabama, near Snowdoun, Montgomery County (Harper, 1942), though the plant should also be looked for particularly in the southern portions of Perry and Hale Counties and also in Sumter and Greene Counties. It seems unlikely that *Q. macrocarpa* does not or has not occurred in some of these other areas in Alabama, in view of the recurrence of the habitat.

*Cotinus obovatus* Raf. occurs east of the Mississippi River only on the Highland Rim-Cumberland Plateau interface near the Tennessee River in northeastern Alabama and adjacent Tennessee (Franklin County). Localized yet large populations of *Cotinus* appear to be always associated with *Mirabilis albida* (Walter) Heimerl and to occur only over Bangor Limestone (as noted by Harper, 1928). The eastern population series is disjunct from populations in northern Arkansas, extreme southern Missouri, and extreme eastern Oklahoma, particularly in the White River watershed. In this western area, plants of *Cotinus* occur over an analogous (or homologous) limestone stratum, though they are also known from sandstone strata (G. L. Tucker, personal communication, 1967). The Alabama populations reproduce substantially from seed, as well as by layering.

*Andrachne phyllanthoides* (Nuttall) Mueller was first collected in Alabama in 1966 (Clark, 1967), after it was discovered by Mrs. Blanche E. Dean along a tributary of the Black Warrior River on the Cumberland Plateau. This is the first population of the plant known from east of Arkansas. Although it appears to reproduce readily by layering, it is not known whether or not the plant reproduces from seed in Alabama.

*Neviusia alabamensis* Gray apparently occurs only in Alabama and Arkansas. The widely scattered Alabama populations evidently are in habitats over calcareous strata. This plant reproduces extensively by asexual means; it is aggressively soboliferous.

*Croton alabamensis* Smith has been the subject of a doctoral dissertation (Farmer, 1962). It is known only from Coffee County, Tennessee (near Tullahoma) and from Bibb and Tuscaloosa Counties, Alabama, where it occurs on the Cumberland Plateau-Coastal Plain interface. Its closest morphological relative appears to be South American. This plant reproduces extensively in isolated populations by both sexual and asexual means (Farmer, 1962). It apparently is restricted to shales and calcareous strata.

*Schisandra glabra* (Brickell) Rehder apparently occurs over calcareous clays or marls in the western "Red Hills" of Alabama. It is sporadic (and relictual) throughout the Southeast (Duncan, 1967), often on similar sites.

*Dirca palustris* L. also occurs sporadically over circumneutral or basic soils in the Southeast.

*Myrica inodora* Bartram has been noted above under the category of plants of the outer Coastal Plain. It occurs only in creek swamps from western Florida through southern Alabama into eastern Mississippi. Its nearest morphological relative in the Nearctic occurs on the west coastal area of the United States (Baird, 1968). Other than the fact that its distribution is pericoastal in an area of high moisture availability, its distribution represents an enigma.

*Minuartia alabamensis* McCormick, Bozeman & Spongberg, recently described, is known only from two granitic outcrops in the upper Piedmont (McCormick, Bozeman & Spongberg, 1971). *Oenothera grandiflora* Bartram evidently occurs only in the Tombigbee River drainage. *Croomia pauciflora* (Nuttall) Torrey is apparently confined to calcareous sites from the Appalachicola River bluffs in northwestern Florida northward sporadically into the Valley and Ridge Province

of Alabama (and Georgia?). In the few populations observed, reproduction appeared to be entirely by means of stolons.

Certain interesting similarities are displayed by the distributions of several of the rare plants above. First, most appear to be at least facultatively asexual. Also, most apparently are restricted to sites which might be expected to offer optimal nutritional possibilities, *i.e.* calcareous sites. Most seem closely associated in their occurrences to a major drainage or drainages. At least two, *Croton alabamensis* and *Cotinus obovatus*, occur primarily on major physiographic boundaries. Several of the above rarities also occur only in association with the southern Cumberland Plateau and its analogues (or, indeed, homologues) the Ouachita Plateau and southern Ozarks. These observations suggest that the present distributions of these plants may be related fairly directly to processes which have shaped and disrupted major physiographic features in the past. Several of these species are also excellent illustrations of the known and expected behavior of many rare plants, *i.e.* restriction to optimal sites and population maintenance by facultative asexuality in relictual habitats.

#### KEYS TO THE WOODY PLANTS OF ALABAMA, WITH AN ANNOTATED CATALOGUE

Taxa in this treatment are listed by family, generally following the phyletic treatment proposed by Radford, Ahles and Bell (1968). Infrafamilial taxa are arranged alphabetically. Flowering and fruiting seasons are included. (Flowering season is listed first; then fruiting season. If flowering and fruiting are continuous, no semicolon separates the seasons; if only one season is listed, flowering and fruiting may both be expected then.)

As much as possible, a conscious effort has been made to list the common names of plants as they are used in Alabama.

Synonymy is listed from the treatments of Mohr (1901), Harper (1928), Small (1933), and Radford, Ahles and Bell (1968). These authors are hereinafter abbreviated M, H, S, and RAB, respectively.

Distribution is given by abbreviation of physiographic provinces, *i.e.* Coastal Plain (CP), Piedmont (P), Appalachian Mountain (AM), Cumberland Plateau (CuP), Valley and Ridge (VR), and Highland Rim (HR). Since the outer Coastal Plain of Alabama constitutes such a distinctive subprovince with respect to its plants, reference is made to it by the abbreviation OCP.

Plants apparently collected for the first time in Alabama during this study include *Veratrum parviflorum* Michaux, *Ilex amelanchier* Curtis, *Amorpha schwerini* Schneider, *Hibiscus syriacus* L., *Rhus typhina* L., *Andrachne phyllanthoides* (Nuttall) Mueller, *Castanea sativa* Miller and *Pyrularia pubera* Michaux. The first specimens of *Minuartia alabamensis* McCormick, Bozeman & Spongberg to be available may have been collected during this study, in 1967 (McCormick, Bozeman & Spongberg, 1971). *Rhododendron flammeum* (Michaux) Sargent has apparently been recognized as such for the first time in Alabama.

A specimen of *Viburnum obovatum* Walter collected by Sidney McDaniel and forwarded to the writer after field work for this study was concluded is evidently the first documentation of this plant in Alabama.





FIGURE 3. County index map of Alabama. (Source: U. S. Department of Commerce, Bureau of the Census, County boundaries as of April 1, 1960.)

The writer considers the presence of 437 taxa of woody plants in 177 genera and 74 families as verifiable in Alabama. The presence of all of these but a very small number (noted individually as they appear in the following text) is based on specimens. Dots in counties on included distributional maps are based on specimens; blank maps are included for taxa whose presence is claimed by reliable reports, but for which no specimens have been seen by the writer. Documented records are also included from Duncan (1967), Hardin (1957), and from correspondence with W. P. Adams (*Hypericum*) and E. W. Chester (*Halesia*). The names and locations of the counties of Alabama are shown in Figure 3.

#### KEYS TO FAMILIES OF WOODY PLANTS OF ALABAMA

- Plant a vine; climbing by twining, tendril-like leaf rachises, or by roots, or trailing on ground or other support ..... KEY 1
- Plant a shrub or tree; habit various, but not climbing on other support or trailing on ground ..... 1
1. Stem thick and fleshy, pad-like; nodes bearing glochidia ..... 50. CACTACEAE
1. Stem not thick and fleshy, not pad-like; nodes not bearing glochidia ..... 2
2. Stem bearing ochreae at nodes ..... 17. POLYGONACEAE
2. Stem not bearing ochreae at nodes, or stem not evident ..... 3

- |  |                  |
|--|------------------|
| 3. Leaves flabelliform, margin lacerate .....  | 5. ARECACEAE     |
| 3. Leaves not flabelliform, or margin not lacerate, or leaves absent .....                     | 4                |
| 4. Leaves linear, acicular or subulate .....   | 5                |
| 5. Leaves lance- or scale-like .....   | 3. CUPRESSACEAE  |
| 5. Leaves linear or needle-like .....  | 6                |
| 6. Perianth present; fruit a drupe or capsule .....  | 7                |
| 7. Flowers bisexual; fruit a capsule .....   | 49. HYPERICACEAE |
| 7. Flowers unisexual; fruit a drupe .....  | 58. EMPETRACEAE  |
| 6. Perianth absent; fruiting structure composed of woody scales ( <i>i.e.</i><br>a cone) ..... | 8                |
| 8. Leaves in fascicles, evergreen .....  | 1. PINACEAE      |
| 8. Leaves alternate or spiralled, evergreen or deciduous .....                                 | 9                |
| 9. Leaves deciduous; bark stringy .....  | 2. TAXODIACEAE   |
| 9. Leaves evergreen; bark roughened to smoothish .....   | 1. PINACEAE      |
| 4. Leaves not linear, needle-like, or scale-like, or leaves absent .....                       | 10               |
| 10. Leaves or leaf-scars opposite or subopposite .....   | KEY 2            |
| 10. Leaves or leaf-scars alternate .....   | KEY 3            |

## KEY 1

## WOODY VINES

- |   |                      |
|---|----------------------|
| 1. Leaves both opposite and compound .....  | 2                    |
| 2. Leaflets entire, 2 per leaf .....  | 71. BIGNONIACEAE     |
| 2. Leaflets toothed or lobed, 3 or more per leaf .....                              | 3                    |
| 3. Leaflets 3 per leaf .....  | 18. RANUNCULACEAE    |
| 3. Leaflets 5 or more per leaf .....  | 71. BIGNONIACEAE     |
| 1. Leaves either alternate or simple .....  | 4                    |
| 4. Leaves alternate .....   | 5                    |
| 5. Leaves compound .....  | 6                    |
| 6. Leaves palmately compound; leaflets more than three .....                        | 44. VITACEAE         |
| 6. Leaves pinnately compound .....  | 7                    |
| 7. Leaflets three .....   | 8                    |
| 8. Flower actinomorphic; fruit a drupe .....  | 35. ANACARDIACEAE    |
| 8. Flower zygomorphic; fruit a legume .....   | 30. FABACEAE         |
| 7. Leaflets more than 3 .....   | 9                    |
| 9. Leaves decompose .....   | 44. VITACEAE         |
| 9. Leaves once compound .....   | 30. FABACEAE         |
| 5. Leaves simple .....  | 10                   |
| 10. Leaves evergreen, or partially so .....   | 11                   |
| 11. Plant with tendrils .....   | 6. LILIACEAE         |
| 11. Plant lacking tendrils .....  | 12                   |
| 12. Leaves entire .....   | 59. ERICACEAE        |
| 12. Leaves lobed or toothed .....   | 13                   |
| 13. Leaves lobed .....  | 54. ARALIACEAE       |
| 13. Leaves toothed .....  | 59. ERICACEAE        |
| 10. Leaves deciduous .....  | 14                   |
| 14. Plant with tendrils .....   | 15                   |
| 15. Tendrils terminating branches .....   | 17. POLYGONACEAE     |
| 15. Tendrils from nodes .....   | 16                   |
| 16. Tendrils arising with leaves, from petiolar sheaths .....                       |                      |
| .....   | 6. LILIACEAE         |
| 16. Tendrils arising opposite leaves .....  | 44. VITACEAE         |
| 14. Plant without tendrils .....  | 17                   |
| 17. Leaf venation palmate .....   | 18                   |
| 18. Inflorescence paniculate; fruit fleshy .....                                    | 19. MENISPERMACEAE   |
| 18. Inflorescence solitary, rarely two flowers to an axil; fruit<br>a capsule ..... | 16. ARISTOLOCHIACEAE |
| 17. Leaf venation pinnate .....   | 19                   |
| 19. Inflorescence terminal .....  | 20                   |
| 20. Leaf margin serrate .....   | 38. CELASTRACEAE     |
| 20. Leaf margin entire, or occasionally sinuate .....                               | 43. RHAMNACEAE       |

19. Inflorescence axillary ..... 21  
 21. Leaf bases cordate ..... 16. ARISTOLOCHIACEAE  
 21. Leaf bases cuneate; rarely truncate ..... 22  
 22. Leaf margin entire or remotely dentate .....  
 ..... 23. SCHISANDRACEAE  
 22. Leaf margin serrate ..... 38. CELASTRACEAE  
 4. Leaves opposite ..... 23  
 23. Vine climbing by means of adventitious roots ..... 26. SAXIFRAGACEAE  
 23. Vine climbing by twining stem ..... 24  
 24. Corolla zygomorphic; fruit a berry ..... 73. CAPRIFOLIACEAE  
 24. Corolla actinomorphic; fruit a follicle or capsule ..... 25  
 25. Naked peduncle of axillary inflorescence more than 1 cm long; fruit  
 a follicle ..... 66. APOCYNACEAE  
 25. Bracted peduncle of axillary inflorescence less than 1 cm long; fruit  
 a capsule ..... 65. LOGANIACEAE

## KEY 2

## SHRUBS OR TREES; LEAVES OPPOSITE

1. Leaves absent at anthesis ..... 2  
 2. Stamens 5 or more; ovary conspicuously lobed ..... 40. ACERACEAE  
 2. Stamens 2; ovary not lobed ..... 64. OLEACEAE  
 1. Leaves present at anthesis, or leaves present ..... 3  
 3. Leaves compound ..... 4  
 4. Leaves palmately compound ..... 41. HIPPOCASTANACEAE  
 4. Leaves pinnately compound ..... 5  
 5. Leaflets lobed ..... 40. ACERACEAE  
 5. Leaflets serrate, not lobed ..... 6  
 6. Inflorescence terminal; fruit a berry or drupe ..... 73. CAPRIFOLIACEAE  
 6. Inflorescence axillary; fruit not a berry or drupe ..... 7  
 7. Leaves 3-foliolate; fruit bladder-like, inflated ..... 39. STAPHYLEACEAE  
 7. Leaves more than 3-foliolate; fruit a samara ..... 64. OLEACEAE  
 3. Leaves simple ..... 8  
 8. Stems and leaves succulent ..... 74. ASTERACEAE  
 8. Stems and leaves not succulent ..... 9  
 9. Flowers and fruit in heads, or compact head-like cymes ..... 10  
 10. Bracts subtending inflorescence large, conspicuous, whitened, not im-  
 bricate, not resembling leaves; fruit a drupe ..... 56. CORNACEAE  
 10. Bracts subtending inflorescences either greatly resembling leaves or  
 imbricate; fruit not fleshy ..... 11  
 11. Corolla lobes 4; fruit 2-seeded ..... 72. RUBIACEAE  
 11. Corolla lobes 5; fruit 1-seeded ..... 74. ASTERACEAE  
 9. Flowers not in heads or compact head-like cymes ..... 12  
 12. Leaves lobed ..... 13  
 13. Ovary inferior; linear stipules present ..... 73. CAPRIFOLIACEAE  
 13. Ovary superior; linear stipules absent ..... 40. ACERACEAE  
 12. Leaves not lobed ..... 14  
 14. Leaf margin entire ..... 15  
 15. Plant entirely green; parasitic on stems of deciduous woody  
 plants ..... 15. LORANTHACEAE  
 15. Plant not green throughout; not parasitic on stems of de-  
 ciduous woody plants ..... 16  
 16. Leaf bases cordate ..... 17  
 17. Stamens 4; capsule less than 5 cm long .....  
 ..... 70. SCROPHULARIACEAE  
 17. Stamens 2; capsule more than 6 cm long .....  
 ..... 71. BIGNONIACEAE  
 16. Leaf bases not cordate ..... 18  
 18. Leaves granular-farinose beneath ..... 65. LOGANIACEAE  
 18. Leaves pubescent to glabrous beneath, but not gran-  
 ular-farinose ..... 19

19. Leaves acuminate to abruptly acuminate ..... 20  
 20. Corolla lobes 5 or less, or corolla lacking;  
 fruit a drupe or drupe-like ..... 21  
 21. Flowers unisexual; corolla lacking;  
 fruit more than 1 cm in diameter .....  
 ..... 14. SANTALACEAE  
 21. Flowers bisexual; corolla present; fruit  
 less than 1 cm in diameter ..... 22  
 22. Inflorescence axillary .....  
 ..... 53. LYTHRACEAE  
 22. Inflorescence terminal ..... 23  
 23. Stamens 5; leaves involute ..  
 ..... 73. CAPRIFOLIACEAE  
 23. Stamens 4; leaves not in-  
 volute ..... 56. CORNACEAE  
 20. Perianth lobes more than 10, undifferent-  
 iated; fruit not drupe-like 24. CALYCANTHACEAE  
 19. Leaves obtuse to acute, not acuminate ..... 24  
 24. Leaf venation penniparallel - 66. APOCYNACEAE  
 24. Leaf venation not penniparallel ..... 25  
 25. Stamens 10 or more; fruit a capsule  
 ..... 49. HYPERICACEAE  
 25. Stamens 2-5; fruit a berry, drupe, or  
 of nutlets enclosed by calyx ..... 26  
 26. Ovary inferior; stamens 5 .....  
 ..... 73. CAPRIFOLIACEAE  
 26. Ovary superior; stamens 4 or less .. 27  
 27. Corolla lobes 4; fruit a drupe  
 ..... 64. OLEACEAE  
 27. Corolla lobes 5; fruit of nut-  
 lets enclosed by calyx .....  
 ..... 68. LAMIACEAE  
 14. Leaf margin not entire ..... 28  
 28. Leaves with occasional large teeth confined to distal half of  
 blade ..... 68. LAMIACEAE  
 28. Leaves regularly crenate, serrate, or dentate, at least distally ... 29  
 29. Inflorescence axillary ..... 30  
 30. Tips of branchlets pubescent ..... 31  
 31. Corolla apopetalous or lacking; flowers uni-  
 sexual; leaves crenate to serrate ..... 64. OLEACEAE  
 31. Corolla gamopetalous; flowers bisexual; leaves  
 coarsely serrate-dentate ..... 67. VERBENACEAE  
 30. Tips of branchlets glabrous ..... 32  
 32. Twigs distinctly greenish ..... 38. CELASTRACEAE  
 32. Twigs distinctly brownish ..... 64. OLEACEAE  
 29. Inflorescence terminal ..... 33  
 33. Ovary partially or wholly inferior ..... 34  
 34. Stamens 5; sepals 5, linear or less than 1 mm  
 long ..... 73. CAPRIFOLIACEAE  
 34. Stamens more than 10; sepals 4, lanceolate to  
 ovate, more than 2 mm long ..... 26. SAXIFRAGACEAE  
 33. Ovary superior ..... 35  
 35. Stamens 4; fruit of 4 nutlets ..... 67. VERBENACEAE  
 35. Stamens 5; fruit drupe-like, but separating into  
 3 nutlets ..... 43. RHAMNACEAE

## KEY 3

## SHRUBS OR TREES; LEAVES ALTERNATE

1. Leaves compound, or absent at time pollen is shed ..... 2  
 2. Leaves absent at time pollen is shed ..... 3

3. Corolla present .....	4
4. Stamens awned .....	59. ERICACEAE
4. Stamens awnless .....	5
5. Corolla apopetalous, or essentially so .....	35. ANACARDIACEAE
5. Corolla gamopetalous, urceolate .....	59. ERICACEAE
3. Corolla absent, or perianth undifferentiated .....	6
6. Elongate, catkin-like cones present .....	2. TAXODIACEAE
6. Elongate cones and catkins absent .....	7
7. Stamens more than 10 .....	29. ROSACEAE
7. Stamens less than 10 .....	12. ULMACEAE
2. Leaves present .....	8
8. Leaves decomposed .....	9
9. Stem spiny .....	10
10. Leaflets, at least some, more than 2 cm broad .....	54. ARALIACEAE
10. Leaflets less than 2 cm broad .....	30. FABACEAE
9. Stem not spiny .....	11
11. Terminal or ultimate leaflets toothed or lobed .....	33. MELIACEAE
11. Terminal or ultimate leaflets entire or crenulate .....	30. FABACEAE
8. Leaves once compound .....	12
12. Teeth of leaflets bearing a conspicuous green gland on the central under- surface of each tooth .....	32. SIMAROUBACEAE
12. Teeth of leaflets lacking conspicuous glands on their under-surfaces, or leaflets not toothed .....	13
13. Leaves trifoliolate, or palmately compound .....	14
14. Stem spiny .....	15
15. Petioles winged; midrib of leaflets not spiny .....	31. RUTACEAE
15. Petioles wingless; midrib of leaflets often retrorsely spiny .....	29. ROSACEAE
14. Stem not spiny .....	16
16. Mature leaves conspicuously glandular above .....	31. RUTACEAE
16. Mature leaves eglandular above .....	17
17. Leaflets obtuse, mucronate .....	30. FABACEAE
17. Leaflets acuminate, not mucronate .....	18
18. Leaves trifoliolate .....	35. ANACARDIACEAE
18. Leaves 4- or more-foliolate .....	44. VITACEAE
13. Leaves pinnately compound, with predominantly more than 3 leaflets ..	19
19. Leaflets entire .....	20
20. Inflorescence axillary; leaflets obtuse to emarginate .....	30. FABACEAE
20. Inflorescence terminal; leaflets acute to acuminate .....	42. SAPINDACEAE
19. Leaflets toothed or lobed .....	21
21. Terminal leaflets of some leaves lobed .....	22
22. Fruit a follicle; corolla much shorter than calyx .....	18. RANUNCULACEAE
22. Fruit a drupe; corolla longer than calyx ..	35. ANACARDIACEAE
21. Terminal leaflets not lobed .....	23
23. Stamens more than 10, not borne in a catkin; fruit fleshy, not a nut, drupe or capsule .....	29. ROSACEAE
23. Stamens 10 or less or male inflorescence a catkin; fruit a drupe, capsule or nut .....	24
24. Terminal leaflets entire .....	35. ANACARDIACEAE
24. Terminal leaflets serrate .....	25
25. Leaflets spotted with large, sessile glands .....	31. RUTACEAE
25. Leaflets lacking glands .....	9. JUGLANDACEAE
1. Leaves simple .....	26
26. Flowers and fruits in heads .....	74. ASTERACEAE
26. Flowers and fruits not in heads .....	27
27. Leaf venation parallel, not netted .....	28

28. Leaf bearing indurate, sharp mucro (capable of piercing flesh), or leaf margin fraying into filamentous threads ..... 6. LILIACEAE
28. Leaf lacking indurate mucro, and margin entire ..... 4. POACEAE
27. Leaf venation netted, or vein single ..... 29
29. Plant in fruit (for plants in flower, see p. 130) ..... 30
30. Inflorescence terminal ..... 31
31. Leaf margins entire, sometimes undulate ..... 32
32. Fruit a drupe, or drupe-like ..... 33
33. Leaves acuminate ..... 34
34. Flowers imperfect; calyx lobes more than 1 mm long; fruit more than 1 cm broad ..... 14. SANTALACEAE
34. Flowers perfect; calyx lobes less than 0.5 mm long; fruit less than 1 cm broad ..... 56. CORNACEAE
33. Leaves obtuse to retuse, sometimes mucronate ..... 35
35. Inflorescence branches plumose, with trichomes exceeding 1 mm in length ..... 35. ANACARDIACEAE
35. Inflorescence densely tomentose, not plumose ..... 29. ROSACEAE
32. Fruit capsular or follicular ..... 36
36. Fruit an aggregate of follicles ..... 37
37. Follicles borne in a single whorl; receptacle not elongate ..... 21. ILLICIACEAE
37. Follicles spiralled on an elongate receptacle ..... 20. MAGNOLIACEAE
36. Fruit a capsule ..... 38
38. Leaves acuminate ..... 39
39. Fruit 3 times or more as long as broad, pubescent ..... 59. ERICACEAE
39. Fruit less than 2 times as long as broad, glabrous ..... 34. EUPHORBIACEAE
38. Leaves retuse, obtuse or acute ..... 40
40. Leaves and twigs heavily vested with silvery, peltate scales ..... 34. EUPHORBIACEAE
40. Leaves and twigs not vested with peltate scales, vestiture various ..... 41
41. Plant creeping ..... 59. ERICACEAE
41. Plant not creeping ..... 42
42. Capsule disintegrating with dehiscence; seed one per locule ..... 34. EUPHORBIACEAE
42. Capsule remaining intact after dehiscence; seeds several to many per locule ..... 43
43. Capsule 3 or more times longer than broad ..... 59. ERICACEAE
43. Capsule less than twice as long as broad ..... 53. LYTHRACEAE
31. Leaf margins serrate, dentate, crenate or lobed ..... 44
44. Fruit a cone-like aggregate of samaras ..... 20. MAGNOLIACEAE
44. Fruit not an aggregate of samaras ..... 45
45. Inflorescence a catkin, sometimes appearing woody ..... 10. BETULACEAE
45. Inflorescence not a catkin ..... 46
46. Inflorescence adnate basally to a single, conspicuous bract ..... 45. TILIACEAE
46. Inflorescence not adnate to a single, basal bract ..... 47
47. Fruit a berry or drupe ..... 48
48. Ovary inferior or partially so ..... 59. ERICACEAE
48. Ovary superior ..... 43. RHAMNACEAE
47. Fruit follicular or capsular ..... 49

49. Fruit of follicles ..... 29. ROSACEAE
49. Fruit a capsule ..... 50
50. Fruit one per inflorescence ..... 51
51. Sepals pubescent, more than 1  
cm long; pedicel much shorter  
than capsule ..... 48. THEACEAE
51. Sepals glabrous or glandular,  
less than 0.5 cm long; pedicel  
much longer than capsule .....  
..... 59. ERICACEAE
50. Fruit 2-many in an inflorescence ... 52
52. Adaxial leaf surface of two  
contrasting colors (variegated)  
..... 59. ERICACEAE
52. Adaxial leaf surface not of two  
contrasting colors ..... 53
53. Capsule 2-3 valved ..... 54
54. Fruit pubescent ..... 55
55. Capsule de-  
pressed apically  
and somewhat  
lobed .....  
..... 57. CLETHRACEAE
55. Capsule not de-  
pressed apically .. 56
56. Fruit co-  
lumnar, not  
beaked;  
stigma per-  
sistent .....  
..... 26. SAXIFRAG-  
ACEAE
56. Fruit ovoid,  
abruptly  
beaked;  
stigmata  
deciduous ..  
..... 27. HAMAMEL-  
IDACEAE
54. Fruit not pubescent  
..... 43. RHAMNACEAE
53. Capsule 4-5 valved ..... 57
57. Sepals densely pu-  
bescent; trichomes  
stellate .. 46. MALVACEAE
57. Sepals glabrous or  
pubescent; trichomes,  
if present, not stel-  
late ..... 59. ERICACEAE
30. Inflorescence axillary ..... 58
58. Fruit a legume ..... 30. FABACEAE
58. Fruit not a legume ..... 59
59. Fruit of achenes or nutlets enclosed by fleshy calyces in  
in multiple fruits ..... 13. MORACEAE
59. Fruit not of achenes or nutlets enclosed by fleshy calyces  
in multiple fruits ..... 60
60. Twigs, leaves and inflorescences heavily vested with  
silvery scales ..... 52. ELAEAGNACEAE
60. Twigs, leaves and inflorescences not vested with  
silvery scales ..... 61

61. Axillary buds entirely enclosed by pulvinus ..... 62  
 62. Leaves lobed ..... 28. PLATANACEAE  
 62. Leaves entire ..... 51. THYMELAEACEAE  
 61. Axillary buds not entirely enclosed by pulvinus ... 63  
 63. Fruit or fruiting structure burr-like ..... 64  
 64. Leaves lobed ..... 65  
 65. Fruit a spherical multiple of 2-valved capsules, without a basal cup ..... 27. HAMAMELIDACEAE  
 65. Fruit not a multiple of capsules, but enclosed by a basal cup ..... 11. FAGACEAE  
 64. Leaves serrate or dentate, not lobed ..... 66  
 66. Fruit spiny or prickly ... 11. FAGACEAE  
 66. Fruit not spiny or prickly, irregularly lobed ..... 12. ULMACEAE  
 63. Fruit or fruiting structure not burr-like ..... 67  
 67. Fruit with irregular projections or lobes ..... 12. ULMACEAE  
 67. Fruit without irregular projections or lobes ..... 68  
 68. Fruit an aggregate of separate pistils, or solitary and remnants or scars of aborted ovaries evident ..... 69  
 69. Leaves serrate, often lobed ... 29. ROSACEAE  
 69. Leaves entire, not lobed ..... 22. ANNONACEAE  
 68. Fruit a single pistil or of several united pistils, not of several apocarpous pistils ..... 70  
 70. Fruit enclosed by a basal cup ..... 11. FAGACEAE  
 70. Fruit not enclosed by a basal cup ..... KEY 4
29. Plant in flower ..... 71  
 71. Flowers imperfect ..... 72  
 72. Flowers, at least one sex, in spherical heads or spiny involucre .. 73  
 73. Staminate heads racemose, the pistillate heads at the base .. 74  
 74. Leaf scars completely encircling the buds ..... 28. PLATANACEAE  
 74. Leaf scars not encircling the buds .. 27. HAMAMELIDACEAE  
 73. Staminate heads not racemose; pistillate flowers variously arranged ..... 75  
 75. Plant monoecious, with pistillate and staminate flowers in separate inflorescences ..... 11. FAGACEAE  
 75. Plant dioecious, or plant monoecious with pistillate and staminate flowers in the same head ..... 76  
 76. Stamens 5 or more ..... 55. NYSSACEAE  
 76. Stamens 4 or absent ..... 13. MORACEAE  
 72. Flowers not in spherical heads ..... 77  
 77. Inflorescence terminal ..... 78  
 78. Plant monoecious ..... 34. EUPHORBIACEAE  
 78. Plant dioecious ..... 79  
 79. Ovary inferior ..... 14. SANTALACEAE  
 79. Ovary superior ..... 80  
 80. Sepals or petals, or both, present ..... 81  
 81. Flowers in cymes or cymules 25. LAURACEAE  
 81. Flowers in catkins ..... 7. SALICACEAE  
 80. Sepals and petals absent ..... 7. SALICACEAE



77. Inflorescences axillary ..... 82
82. Corolla white or pinkish ..... 83
83. Corolla lobes united for less than  $\frac{1}{3}$  of their lengths, corolla rotate ..... 37. AQUIFOLIACEAE
83. Corolla lobes united for more than  $\frac{1}{2}$  of their lengths, corolla urceolate ..... 61. EBENACEAE
82. Corolla greenish, brownish, yellow, or absent ..... 84
84. Plant dioecious ..... 85
85. Inflorescences in the axils of new leaves, or calyx present ..... 86
86. Stamens 5 or more; pistil absent ..... 87
87. Inflorescence pedunculate ..... 55. NYSSACEAE
87. Inflorescence sessile ..... 62. SYMPLOCACEAE
86. Stamens 4 or pistil present ..... 13. MORACEAE
85. Inflorescences in axils of leaves of preceding year; calyx absent ..... 88
88. Leaves evergreen, irregularly or remotely toothed ..... 8. MYRICACEAE
88. Leaves deciduous, regularly serrate ..... 7. SALICACEAE
84. Plant monoecious ..... 89
89. Perianth lobes evident, more than 1 mm long; inflorescence never a catkin ..... 90
90. Ovary pubescent; perianth undifferentiated ..... 12. ULMACEAE
90. Ovary glabrous; perianth differentiated into calyx and corolla ..... 34. EUPHORBIACEAE
89. Perianth lobes less than 1 mm long or absent; inflorescence often a catkin ..... 91
91. Pistillate and staminate flowers in catkins, or not in catkins and the pistillate flowers terminal ..... 10. BETULACEAE
91. Pistillate flowers not in catkins, or in catkins and not terminal ..... 11. FAGACEAE
71. Flowers perfect ..... 92
92. Inflorescence terminal ..... 93
93. Corolla absent, or perianth undifferentiated ..... 94
94. Stamens less than 10 ..... 95
95. Leaves almost fully expanded at anthesis ..... 14. SANTALACEAE
95. Leaves absent at anthesis ..... 12. ULMACEAE
94. Stamens more than 10 ..... 27. HAMAMELIDACEAE
93. Corolla and calyx both present and discernible ..... 96
96. Stamens 2 times or less the number of calyx lobes ..... 97
97. Ovary inferior ..... 98
98. Corolla apopetalous ..... 56. CORNACEAE
98. Corolla gamopetalous ..... 59. ERICACEAE
97. Ovary superior ..... 99
99. Adaxial leaf surface of two contrasting colors ..... 59. ERICACEAE
99. Adaxial leaf surface not of two contrasting colors ..... 100
100. Corolla gamopetalous ..... 59. ERIACEAE
100. Corolla apopetalous ..... 101
101. Leaves entire ..... 102
102. Pedicels plumose ..... 35. ANACARDIACEAE
102. Pedicels glabrous ..... 103

103. Leaves less than 1 cm long --- 43. RHAMNACEAE
103. Leaves more than 1 cm long -----  
----- 36. CYRILLACEAE
101. Leaves crenate or serrate ----- 104
104. Stamens twice the number of calyx lobes -----  
----- 57. CLETHRACEAE
104. Stamens equal to the number of calyx lobes ----- 105
105. Sepals pubescent -----  
----- 26. SAXIFRAGACEAE
105. Sepals glabrous -----  
----- 43. RHAMNACEAE
96. Stamens more than twice the number of calyx lobes -- 106
106. Inflorescence adnate to a conspicuous, basal bract ----- 45. TILIACEAE
106. Inflorescence not adnate to a conspicuous, basal bract ----- 107
107. Flower solitary, rarely 2 together ----- 108
108. Sepals stellate-pubescent 46. MALVACEAE
108. Sepals not stellate-pubescent, but simply pubescent ----- 48. THEACEAE
107. Flowers in racemes, panicles, corymbs, or axillary fascicles ----- 109
109. Sepals densely stellate-pubescent ---  
----- 46. MALVACEAE
109. Sepals glabrous to pubescent, but not stellate-pubescent ----- 110
110. Style 1 ----- 111
111. Sepals densely pubescent; shrub less than 0.5 m tall ----- 29. ROSACEAE
111. Sepals glabrous; shrub or tree more than 1 m tall --  
----- 53. LYTHRACEAE
110. Styles several ----- 29. ROSACEAE
92. Inflorescence axillary ----- 112
112. Petals absent, or perianth undifferentiated ----- 113
113. Leaves, twigs and calyces vested with silvery, peltate scales ----- 52. ELAEAGNACEAE
113. Leaves, twigs, and calyces not vested with peltate scales, or leaves absent ----- 114
114. Leaves lobed ----- 115
115. Inflorescence paniculate; ovary stipitate; sepals more than 2 mm long 47. STERCULIACEAE
115. Inflorescence capitate, racemose, umbellate, or solitary; ovary sessile; sepals less than 2 mm long ----- 55. NYSSACEAE
114. Leaves not lobed, or leaves absent ----- 116
116. Calyx synsepalous ----- 117
117. Corolla absent ----- 51. THYMELAEACEAE
117. Corolla present ----- 59. ERICACEAE
116. Calyx aposepalous or lacking ----- 118
118. Calyx less than 1 mm long -----  
----- 55. NYSSACEAE
118. Calyx more than 1 mm long ----- 119
119. Stamens more than 10 -----  
----- 29. ROSACEAE

119. Stamens less than 10 ..... 120  
 120. Ovary laterally flattened,  
 2-notched apically — 12. ULMACEAE  
 120. Ovary terete, not api-  
 cally notched .....  
 ..... 35. ANACARDIACEAE
112. Corolla and calyx both present and discernible ..... 121  
 121. Inflorescence adnate to a conspicuous basal bract .....  
 ..... 45. TILIACEAE
121. Inflorescence not adnate to a conspicuous basal bract — 122  
 122. Sepals or calyx lobes 3 ..... 123  
 123. Petals 3; leaves evergreen — 25. LAURACEAE  
 123. Petals 6 or more; leaves deciduous .....  
 ..... 22. ANNONACEAE
122. Sepals or calyx lobes more than 3 ..... 124  
 124. Ovary partially or entirely inferior ..... 125  
 125. Stamens more than twice the number  
 of corolla lobes ..... 62. SYMPLOCACEAE  
 125. Stamens twice or fewer than twice the  
 number of corolla lobes ..... 126  
 126. Corolla gamopetalous; anthers  
 poricidal ..... 59. ERICACEAE  
 126. Corolla apopetalous; anthers  
 septicidal ..... 26. SAXIFRAGACEAE
124. Ovary superior ..... 127  
 127. Petals united, at least basally ..... 128  
 128. Stamens 5, or more and the  
 same number as the corolla  
 lobes ..... 129  
 129. Staminodia petaloid .....  
 ..... 60. SAPOTACEAE  
 129. Staminodia absent ..... 130  
 130. Corolla rotate .....  
 ..... 37. AQUIFOLIACEAE  
 130. Corolla salverform  
 ..... 69. SOLANACEAE
128. Stamens 8 or more, more nu-  
 merous than the corolla lobes — 131  
 131. Stamens twice as many  
 as the corolla lobes ..... 132  
 132. Anthers opening by  
 slits their entire  
 lengths ..... 133  
 133. Petals united  
 for  $\frac{1}{2}$  their  
 lengths .....  
 ..... 61. EBENACEAE  
 133. Petals united  
 for less than  
 $\frac{1}{3}$  their  
 lengths .....  
 ..... 63. STYRACACEAE
132. Anthers opening by  
 pores or slits at the  
 ends — 59. ERICACEAE
131. Stamens 3 or more times  
 as many as the corolla  
 lobes ..... 134  
 134. Flowers on a leaf-  
 less portion of

- branch; petals united only at base  
 ----- 62. SYMPLOCACEAE
134. Flowers in leaf axils of new growth; petals united for more than  $\frac{1}{2}$  their lengths 61. EBENACEAE
127. Petals separate ----- 135
135. Corolla zygomorphic, papilionaceous ----- 30. FABACEAE
135. Corolla neither zygomorphic nor papilionaceous ----- 136
136. Corolla more than 2.5 cm broad ----- 137
137. Style enclosed by a staminal tube -----  
 ----- 46. MALVACEAE
137. Style or styles not enclosed by a staminal tube 48. THEACEAE
136. Corolla less than 2.5 cm broad ----- 138
138. Petals 4 -----  
 ----- 27. HAMAMELIDACEAE
138. Petals 5 or more .. 139
139. S t a m e n s equal to the number of corolla lobes ----  
 ----- 37. AQUIFOLIACEAE
139. S t a m e n s twice or more the number of petals or corolla lobes .. 140
140. Stamens twice the number of petals or corolla lobes ----  
 ----- 63. STYRACACEAE
140. Stamens more than twice the number of petals ..  
 ----- 29. ROSACEAE

## KEY 4

From lead 70, KEY 3

1. Fruit fleshy; a drupe, drupelets, berry or pome ----- 2
2. Ovary inferior ----- 3
3. Fruit several-seeded, a berry or pome ----- 4
4. Fruit a pome ----- 29. ROSACEAE

4. Fruit a berry .....	5
5. Leaves lobed .....	26. SAXIFRAGACEAE
5. Leaves serrate, not lobed .....	59. ERICACEAE
3. Fruit 1-seeded; a drupe or nut .....	6
6. Calyx lobes 5 .....	62. SYMPLOCACEAE
6. Calyx absent .....	55. NYSSACEAE
2. Ovary superior .....	7
7. Leaves entire .....	8
8. Calyx lacking or not persistent on fruit .....	9
9. Leaves acuminate, cordate .....	34. EUPHORBIACEAE
9. Leaves obtuse, not cordate .....	51. THYMELAEACEAE
8. Calyx present at base of fruit .....	10
10. Fruit several-seeded .....	11
11. Fruit on spur branches .....	60. SAPOTACEAE
11. Fruit not on spur branches .....	12
12. Calyx more than 1 cm broad .....	61. EBENACEAE
12. Calyx less than 1 cm broad .....	13
13. Drupelets less than 5 per fruit .....	43. RHAMNACEAE
13. Seeds more than 10 per fruit .....	69. SOLANACEAE
10. Fruit 1-seeded .....	14
14. Fruit on spur branches .....	60. SAPOTACEAE
14. Fruit not on spur branches .....	25. LAURACEAE
7. Leaves not entire .....	15
15. Lower leaves opposite .....	67. VERBENACEAE
15. All leaves alternate .....	16
16. Drupelets several per fruit .....	17
17. Fruit lobed .....	43. RHAMNACEAE
17. Fruit unlobed .....	37. AQUIFOLIACEAE
16. Drupe 1 per fruit .....	18
18. Leaves lobed .....	25. LAURACEAE
18. Leaves not lobed .....	19
19. Inflorescence adnate basally to a conspicuous bract .....	45. TILIACEAE
19. Inflorescence not adnate to a conspicuous basal bract .....	20
20. Fruit pubescent or granular .....	21
21. Fruit thickly appressed-pubescent with stellate trichomes .....	63. STYRACACEAE
21. Fruit granular, waxy, not vested with stellate trichomes .....	8. MYRICACEAE
20. Fruit not pubescent or granular .....	22
22. Leaves strongly oblique, cuneate to truncate .....	12. ULMACEAE
22. Leaves symmetrical, cuneate to attenuate .....	29. ROSACEAE
1. Fruit dry; a capsule, achene, nut, utricle or samara .....	23
23. Leaves lobed .....	24
24. Fruit 1-3-seeded, glabrous .....	47. STERCULIACEAE
24. Fruit many-seeded, thickly stellate-pubescent .....	46. MALVACEAE
23. Leaves not lobed .....	25
25. Leaves entire .....	26
26. Fruit granular, waxy .....	8. MYRICACEAE
26. Fruit not granular and waxy .....	27
27. Fruit dehiscent .....	59. ERICACEAE
27. Fruit indehiscent .....	36. CYRILLACEAE
25. Leaves serrate or cuneate .....	28
28. Fruit a capsule .....	29
29. Seeds with a coma; leaves acuminate .....	7. SALICACEAE
29. Seeds devoid of coma; leaves not acuminate .....	30
30. Capsule beaked .....	27. HAMAMELIDACEAE
30. Capsule not beaked .....	48. THEACEAE
28. Fruit not a capsule .....	31

31. Leaves cordate or obliquely cordate ..... 32  
 32. Inflorescence adnate to a conspicuous basal bract; fruit a nut-like drupe ..... 45. TILIACEAE  
 32. Inflorescence not adnate to a basal bract; fruit a samara ..... 12. ULMACEAE  
 31. Leaves cuneate to attenuate ..... 33  
 33. Surface of fruit granular, waxy, not stellate-pubescent nor winged ..... 8. MYRICACEAE  
 33. Surface of fruit either stellate-pubescent or winged ..... 63. STYRACACEAE

## 1. PINACEAE

1. Leaves fasciculate ..... 1. *Pinus*  
 1. Leaves borne singly ..... 2. *Tsuga*

1. *Pinus* L., PINE

1. Fascicular sheaths averaging more than 2 cm long ..... 5. *P. palustris*  
 1. Fascicular sheaths averaging less than 2 cm long ..... 2  
 2. Bark of 1-year-old twigs, branches, and upper trunk smooth, not exfoliating ..... 4. *P. glabra*  
 2. Bark of 1-year-old twigs, branches, and upper trunk obviously cracked, roughened, readily exfoliating ..... 3  
 3. Leaves predominantly more than 1 dm long ..... 4  
 4. Leaves, at least some, in fascicles of 2; upper portion of distal end of cone scale shiny ..... 5  
 5. Cone turbinate, serotinous ..... 6. *P. serotina*  
 5. Cone oblong-conical, opening promptly when mature ..... 3. *P. elliotii*  
 4. Leaves all in fascicles of 3; upper portion of distal end of cone scale not shiny ..... 7. *P. taeda*  
 3. Leaves predominantly less than 1 dm long ..... 6  
 6. Leaves entirely in fascicles of 3 ..... 7  
 7. Cone turbinate, serotinous ..... 6. *P. serotina*  
 7. Cone oblong-conical, opening promptly when mature ..... 7. *P. taeda*  
 6. Leaves in fascicles of 2 and 3 ..... 8  
 8. Leaves strongly twisted, or cone scale prickles indurate, stout, recurved ..... 9  
 9. Bark of young twigs reddish; seed subovoid ..... 8. *P. virginiana*  
 9. Bark of young twigs gray to tan; seed subtriangular ..... 1. *P. clausa*  
 8. Leaves not strongly twisted, or cone scale prickle weak, slender, straight ..... 1. *P. clausa*, 2. *P. echinata*

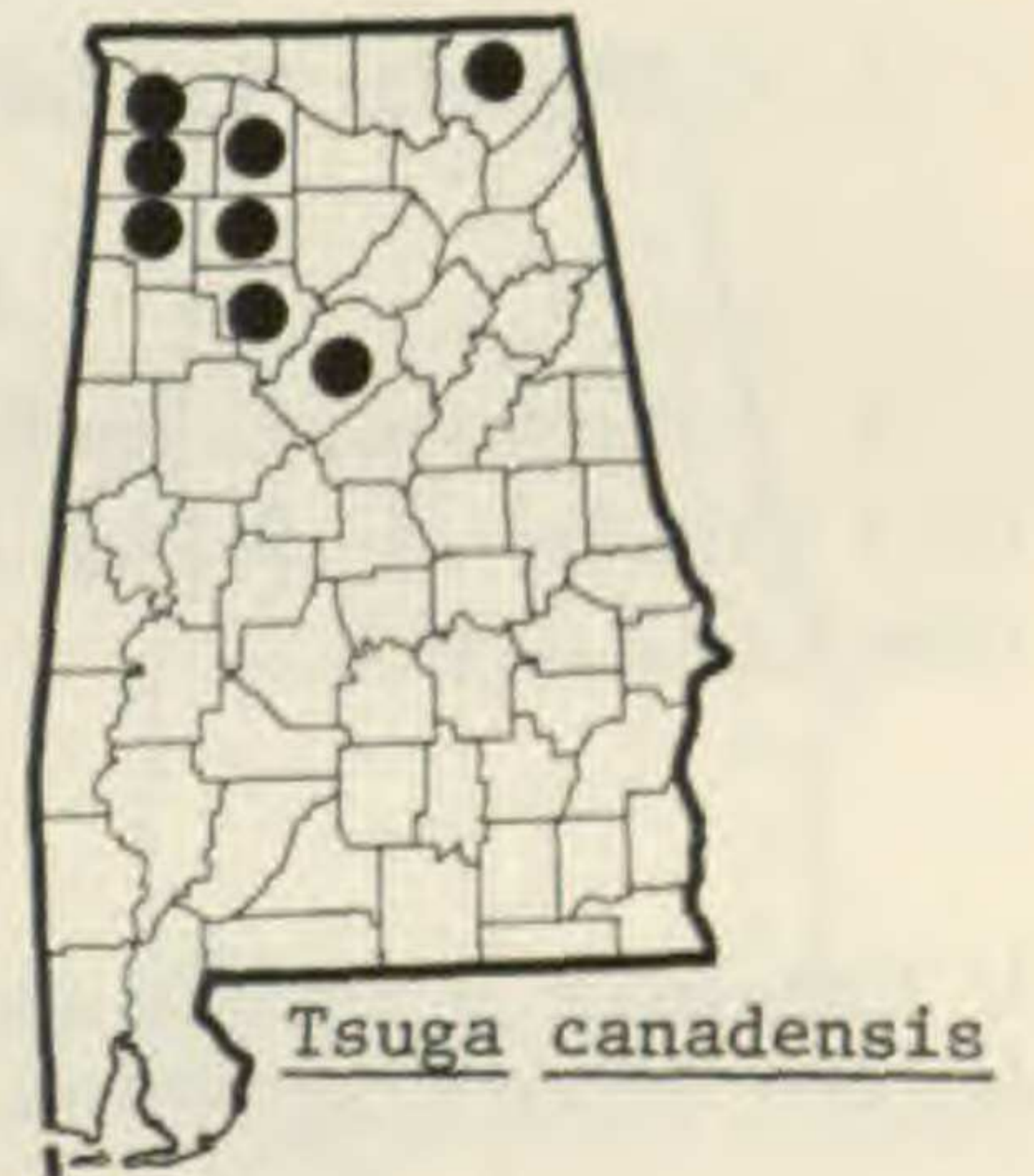
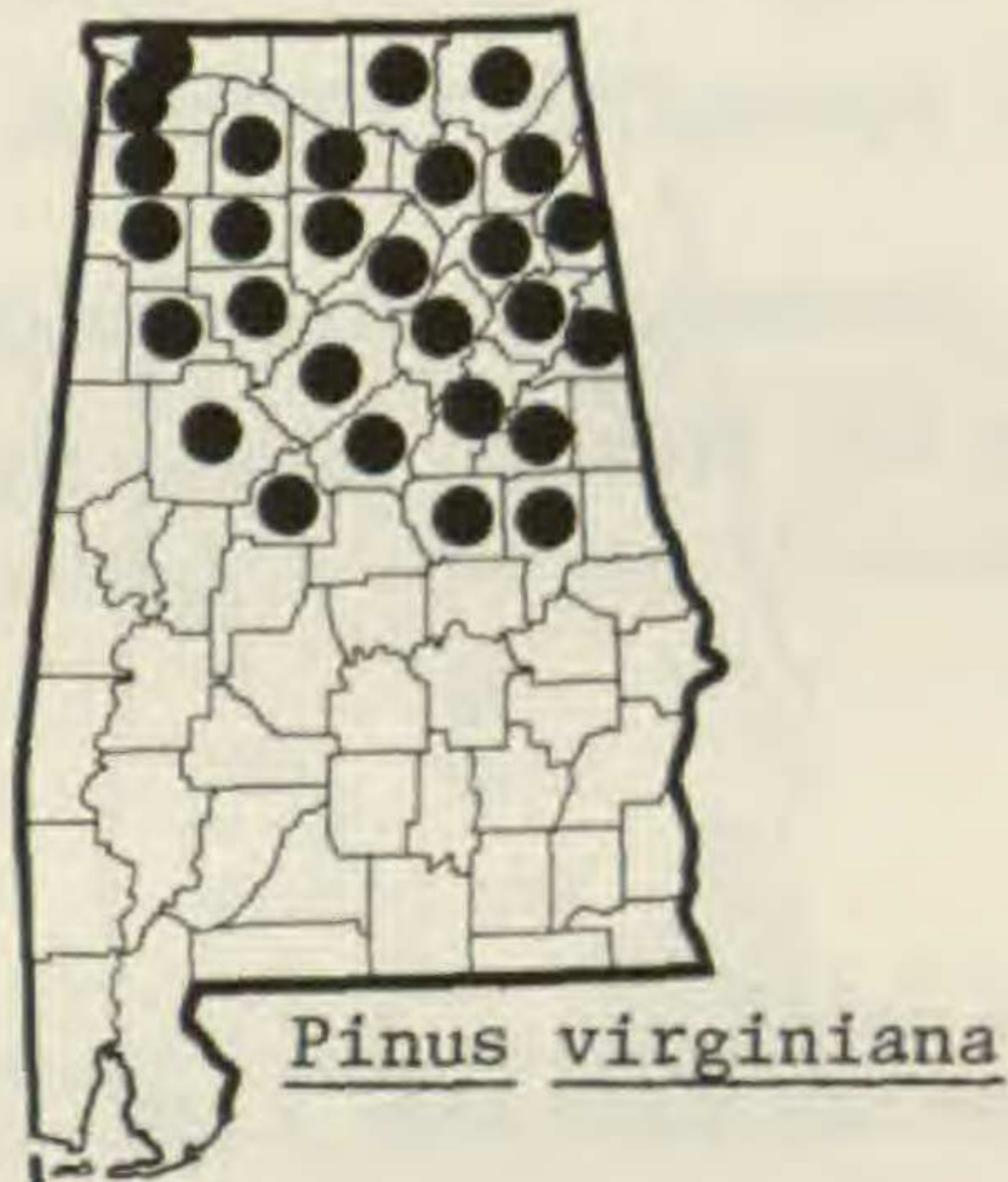
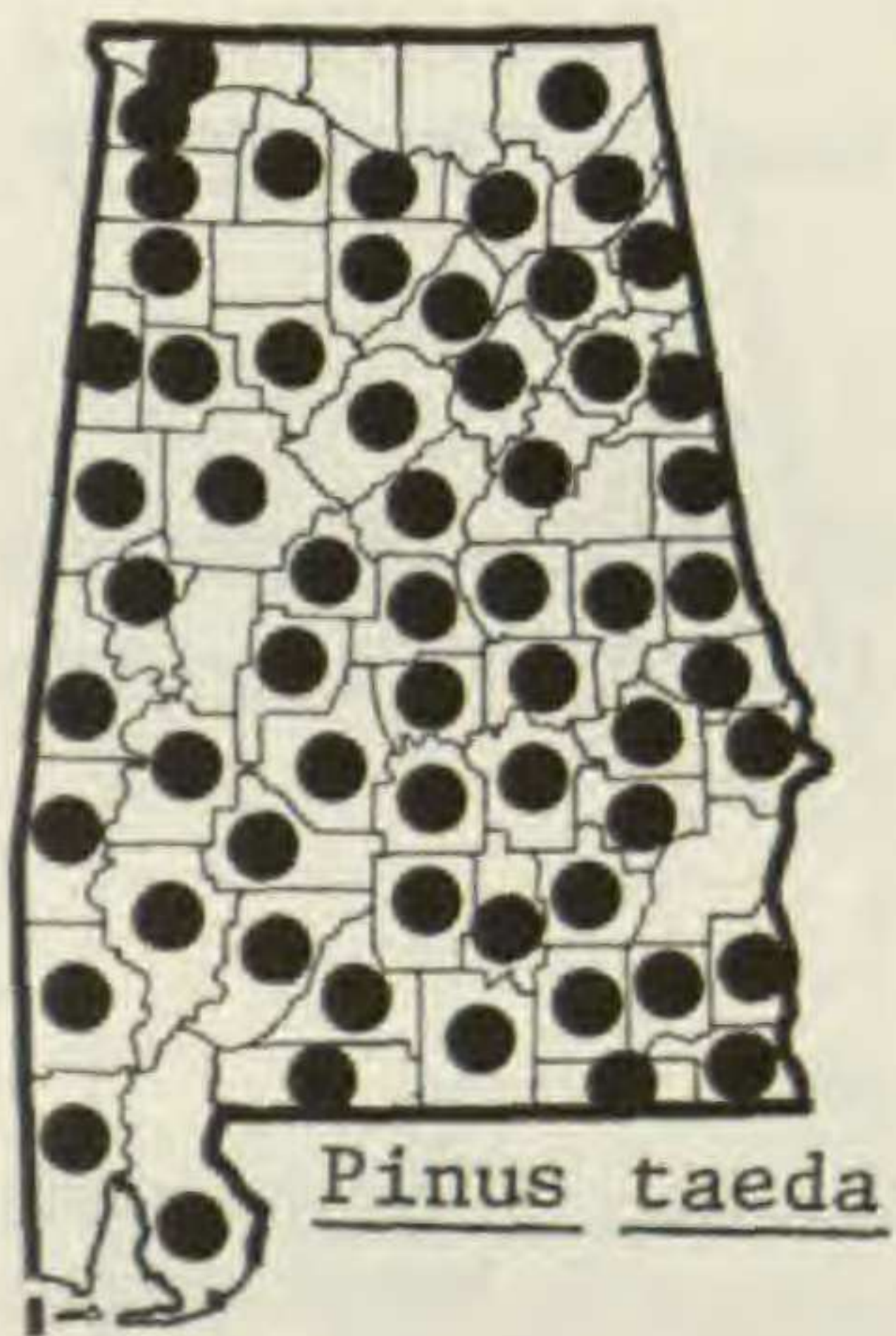
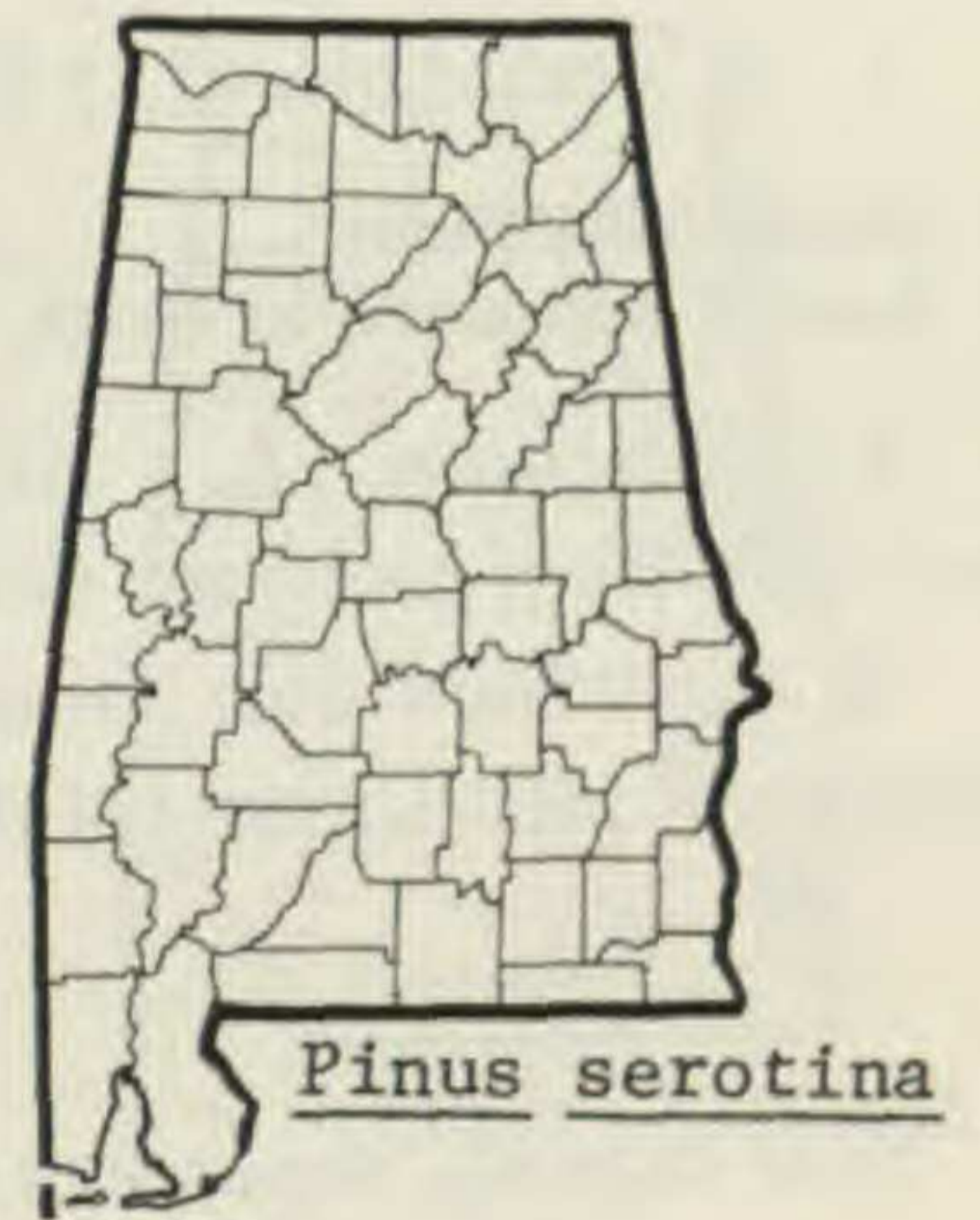
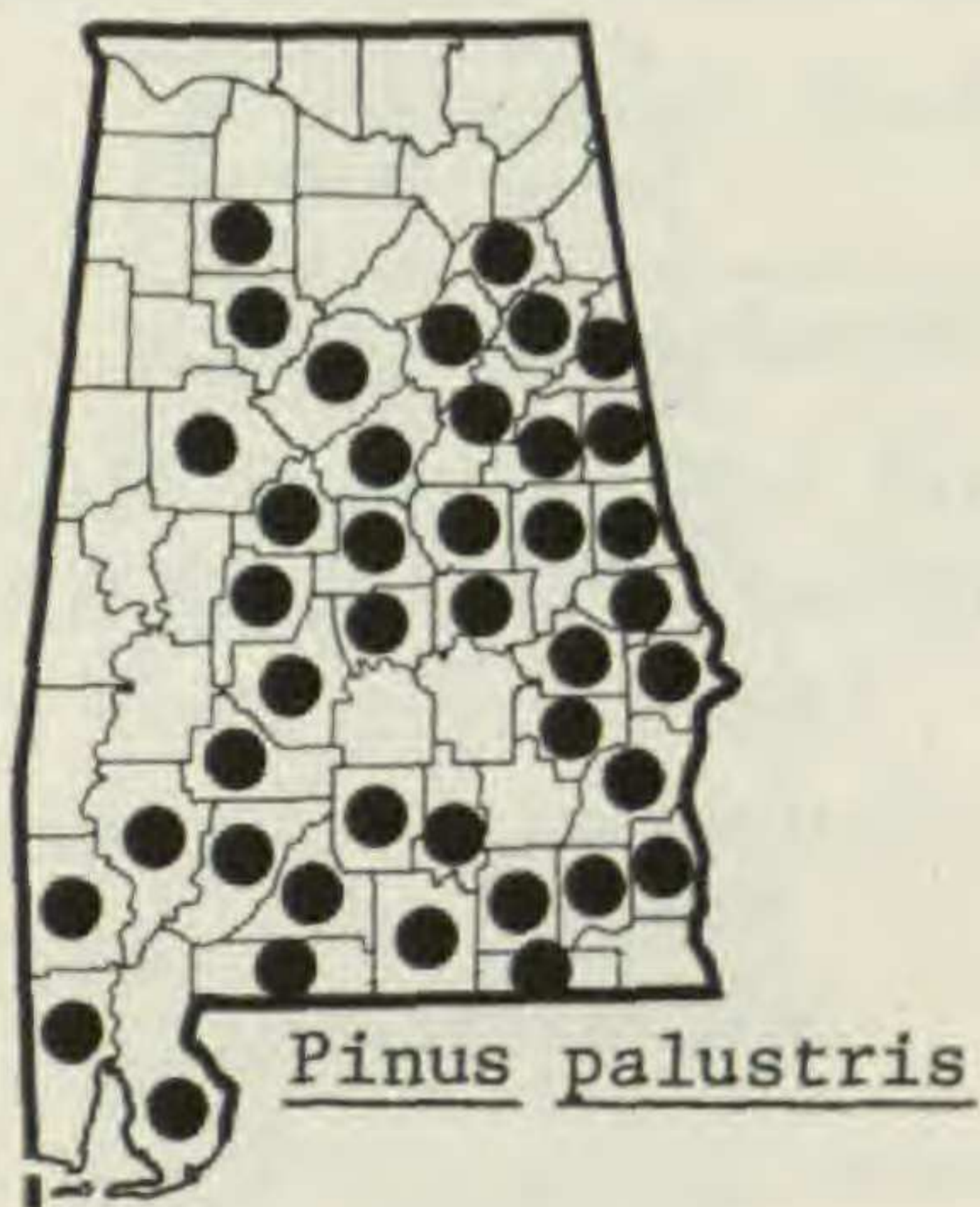
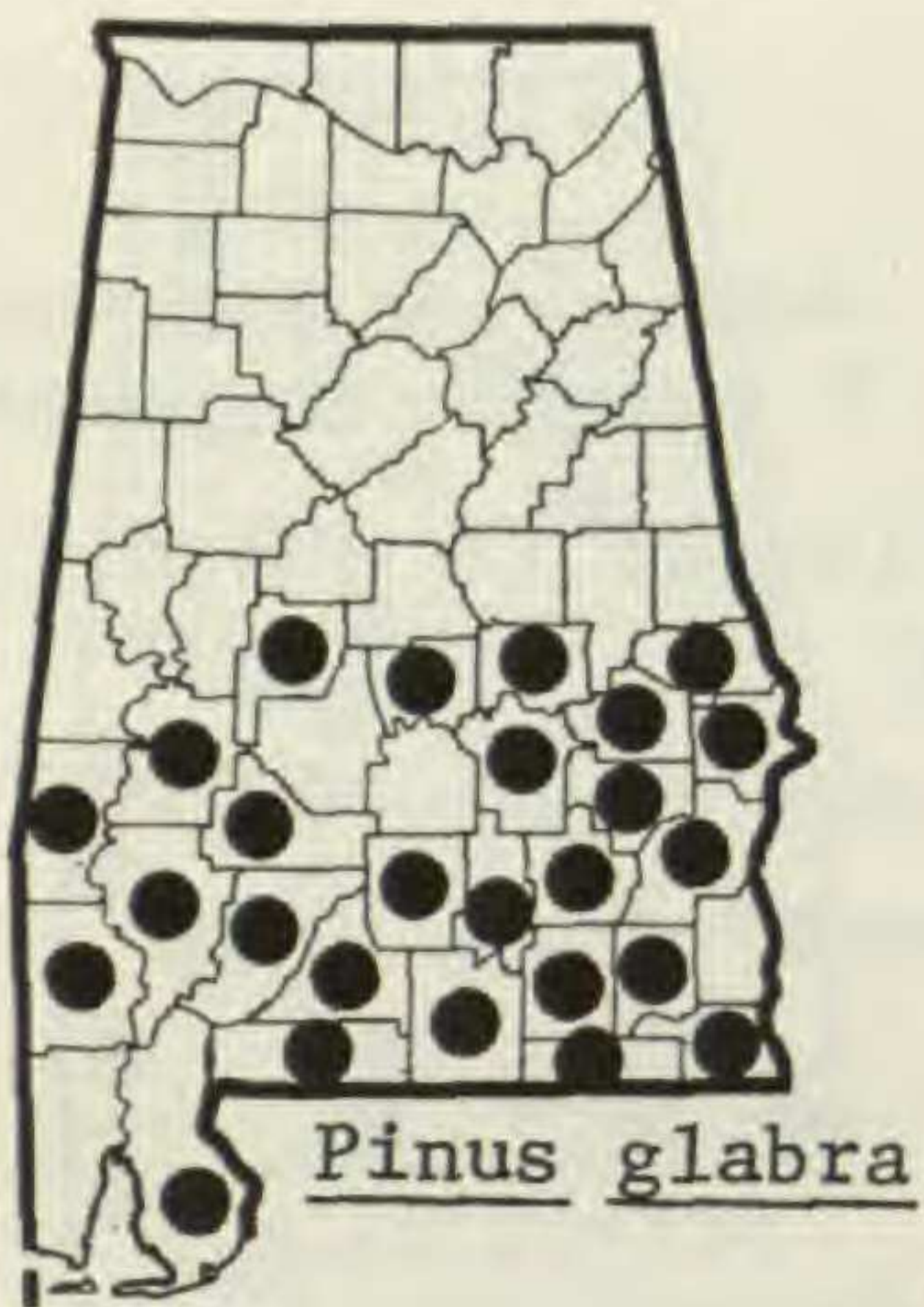
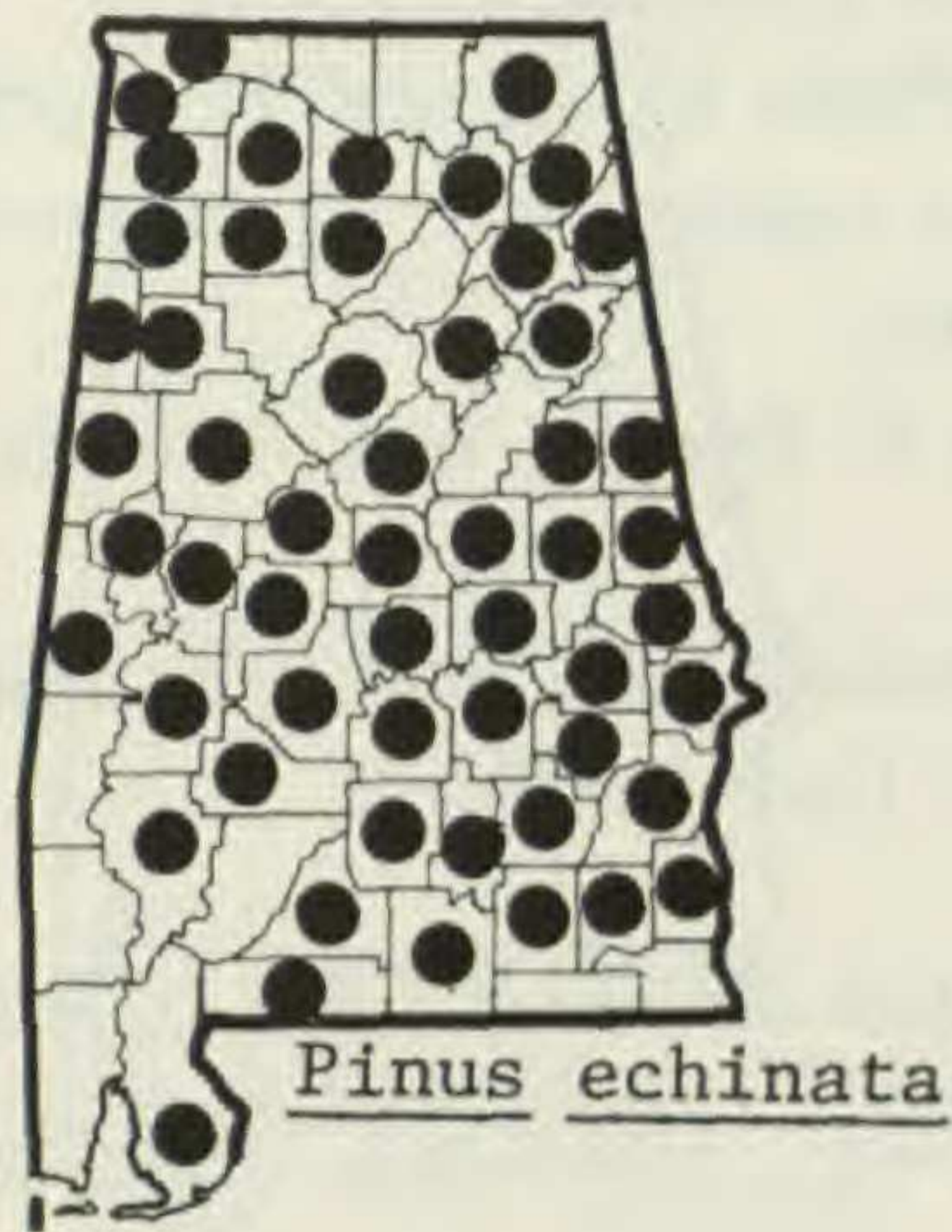
In Alabama there are no characteristics known to the writer which will enable one to separate consistently *Pinus echinata* from *P. clausa*, since the western race of *P. clausa* (constituting the only population of this species in Alabama) does not bear serotinous cones. It is interesting to speculate that the "open cone" race of *P. clausa* might have arisen as a result of introgression with *P. echinata*, or that populations of *P. echinata* may have given rise to *P. clausa* by the development of serotiny.

1. *P. clausa* (Chapman) Vasey, SAND P., FLORIDA SPRUCE P. Spring; fall. Beaches, dunes, rare; OCP. *P. clausa* (Engelm.) Sarg.—M, H; *P. clausa* (Engelm.) Vasey—S.

2. *P. echinata* Miller, SHORT-LEAF P. Spring; fall. Old fields, woods, throughout, but rare in HR and southwest Alabama.

3. *P. elliotii* Engelm., SLASH P. Spring; fall. Low woods, savannas; OCP and occasionally escaping from plantings northward. *P. heterophylla* (Ell.) Sudw.—M; *P. palustris* Mill.—S.

1. PINACEAE



4. *P. glabra* Walter, SPRUCE P. Spring; fall. Low woods, flood-plains; CP.  
 5. *P. palustris* Miller, LONG-LEAF P. Spring; fall. Upland woods, old fields; CP, CuP, AM, VR. *P. australis* Michx. f.—S.  
 6. *P. serotina* Michaux, POND P., BLACK P. Spring; fall. Low woods, creek swamps, rare. Reported from eastern CP by Harper (1928), Dean (1961), and Radford, Ahles and Bell (1968).  
 7. *P. taeda* L., LOBLOLLY P. Spring; fall. Woods and fields, throughout; rare in HR.  
 8. *P. virginiana* Miller, VIRGINIA P., SCRUB P., NIGGER P. Spring; fall. Upland fields and woods, xeric slopes; CuP, AM, VR.

## 2. *Tsuga* (Endl.) Carr., HEMLOCK

1. *T. canadensis* (L.) Carr., HEMLOCK, SPRUCE PINE. Spring; fall. Mesic slopes and ravines; CuP.

## 2. TAXODIACEAE

### 1. *Taxodium* Richard, CYPRESS

1. *T. distichum* (L.) Richard. Spring; fall.

1. Leaves distichous ..... *T. distichum* var. *distichum*  
 1. Leaves appressed to twigs, or strongly ascending ..... *T. distichum* var. *nutans*

*T. distichum* (L.) Richard var. *distichum*, BALD C., SWAMP C., RIVER C. Swamps, river margins; throughout CP and rare in HR, VR, P.

*T. distichum* var. *nutans* (Aiton) Sweet, POND C. Swamps, ponds; OCP. *T. distichum imbricaria* (Nutt.) Sudw.—M; *T. ascendens* Brongn.—S, H, RAB.

## 3. CUPRESSACEAE

1. Plant bisexual, monoecious; mature pistillate cone leathery or woody; seeds winged ..... 1. *Chamaecyparis*  
 1. Plant unisexual, plants dioecious; mature pistillate cone baccate; seeds wingless ..... 2. *Juniperus*

### 1. *Chamaecyparis* Spach, WHITE CEDAR

1. *C. thyoides* (L.) BSP. Spring; fall. Low woods, creek swamps, rare; OCP.

### 2. *Juniperus* L., RED CEDAR

1. *J. virginiana* L. Spring; fall. Habitats various; throughout. *Sabina virginiana* (L.) Antoine—S; *Sabina silicicola* Sm.—S; *J. barbadensis* L.—M; *J. silicicola* (Sm.) Bail.—RAB.

## 4. POACEAE

1. Culm terete or subterete above node ..... 1. *Arundinaria*  
 1. Culm distinctly flattened on one side above node ..... 2. *Phyllostachys*

### 1. *Arundinaria* Michaux, CANE

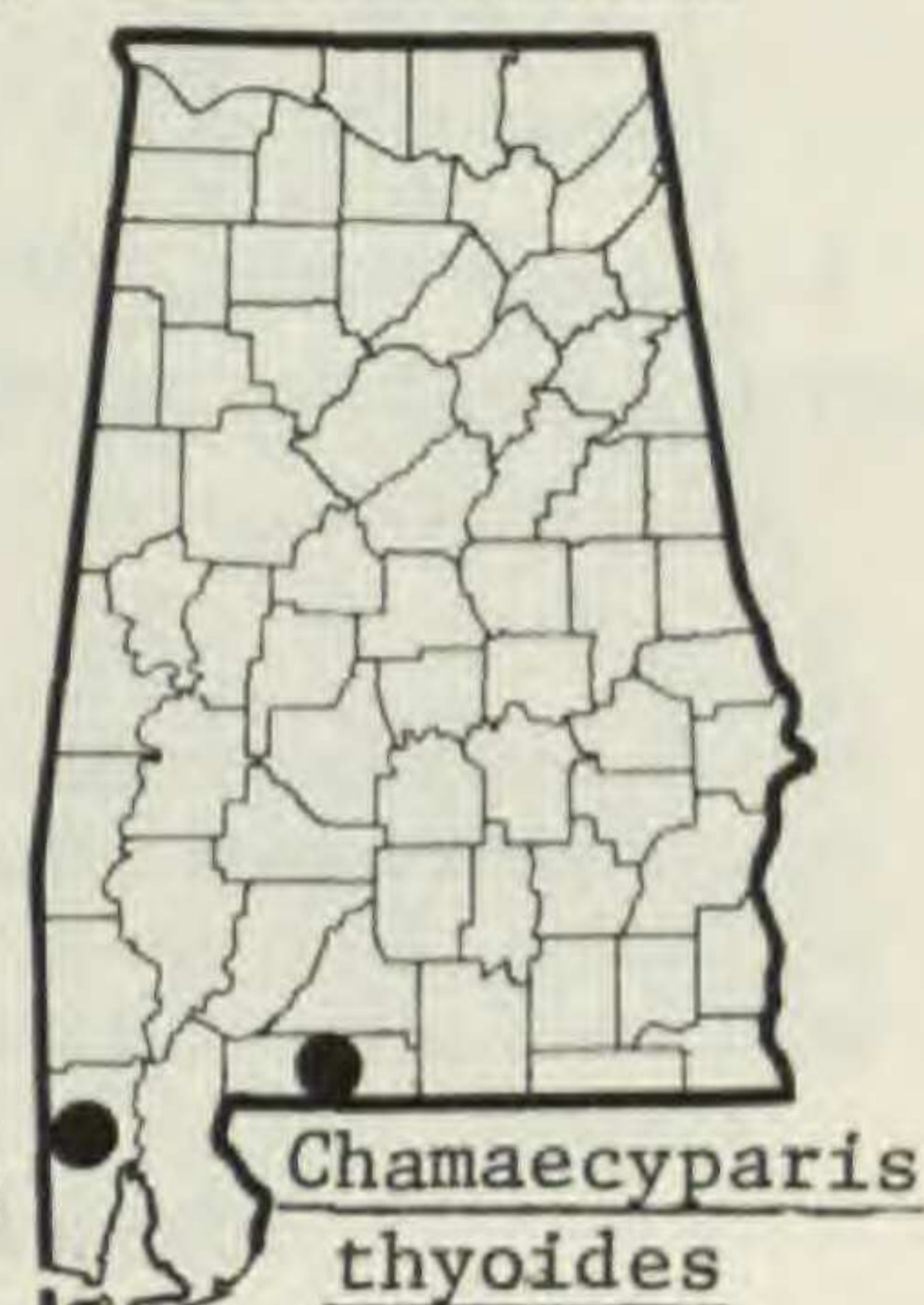
1. *A. gigantea* (Walter) Muhl. Spring. Ravines, mesic and dry slopes, alluvial



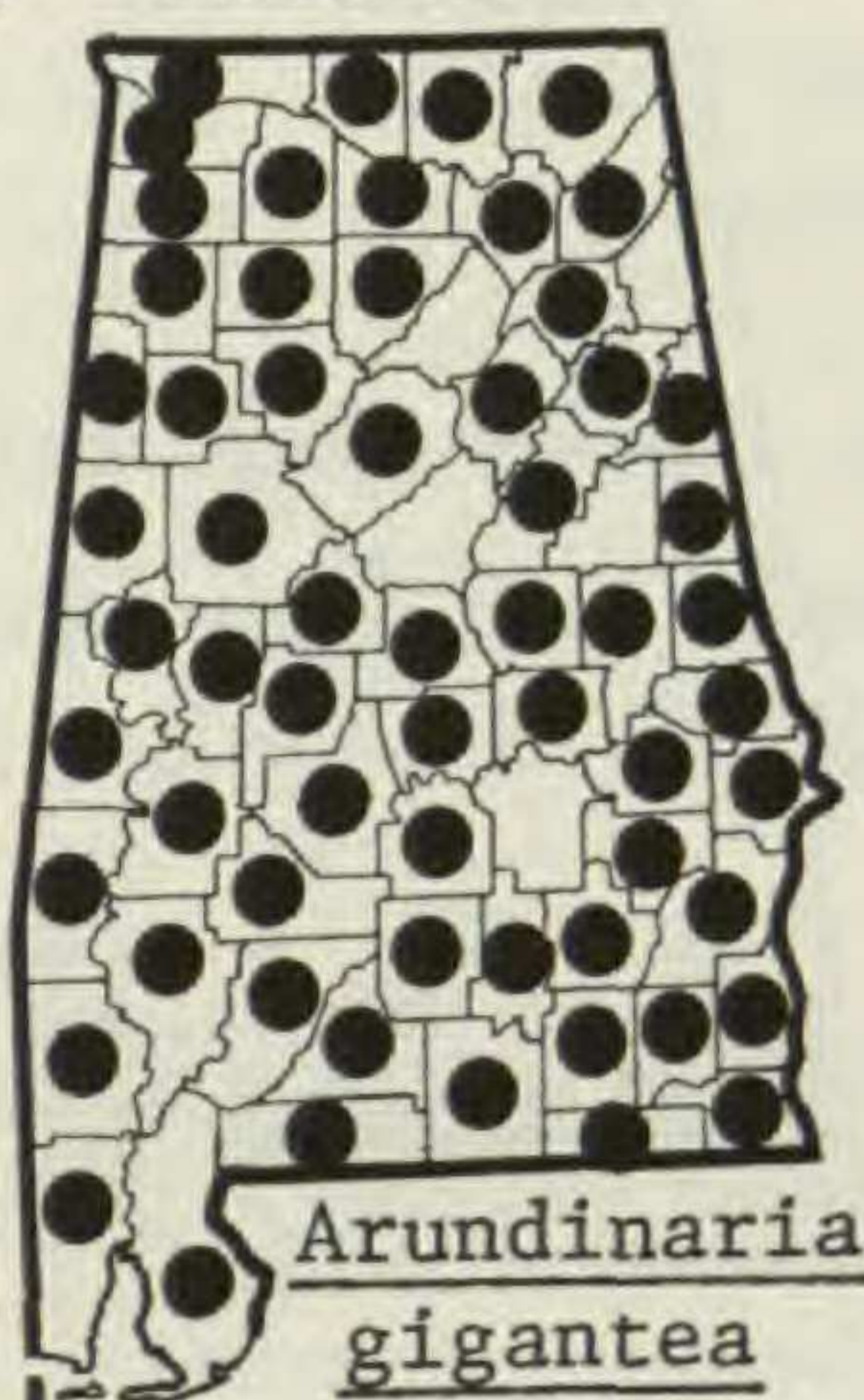
2. TAXODIACEAE



3. CUPRESSACEAE



4. POACEAE



5. ARECACEAE



woods; throughout. *A. gigantea* (Walt.) Chap.—M; *A. tecta* (Walt.) Muhl.—M, S, H; *A. macrosperma* Michx.—H.

## 2. *Phyllostachys* Sieb. & Zucc.

1. *P. aurea* Riv. Flowers, fruit not seen. Planted for fishpoles and escaping, scattered localities mostly in CP.

## 5. ARECACEAE

- |   |                          |
|---|--------------------------|
| 1. Petiole coarsely serrate .....   | 3. <i>Serenoa</i>        |
| 1. Petiole not coarsely serrate .....                                     | 2                        |
| 2. Leaves silvery-scurfy beneath; leaf sheaths armed with stout spines .. | 1. <i>Rhapidophyllum</i> |
| 2. Leaves glabrous beneath; leaf sheaths unarmed .....                    | 2. <i>Sabal</i>          |

### 1. *Rhapidophyllum* Wendland & Drude, NEEDLE-PALM

1. *R. hystrix* (Pursh) Wendland & Drude. Flowers, fruits not seen. Swamp forests, rich ravines, rare; principally CP, and more common southeastward.

### 2. *Sabal* Adanson, PALMETTO

1. *S. minor* (Jacquin) Persoon, DWARF P. Late spring–summer; fall. Alluvial woods; CP and rare in VR. *S. minus* (Jacq.) Pers.—M; *S. minor* Jacq.—H.

### 3. *Serenoa* Hooker, SAW PALMETTO

1. *S. repens* (Bartram) Small. Late spring–summer; fall. Low pinelands, savannas, sand ridges and dunes; OCP. *S. serrulata* (Michx.) Benth. & Hook.—M, H.

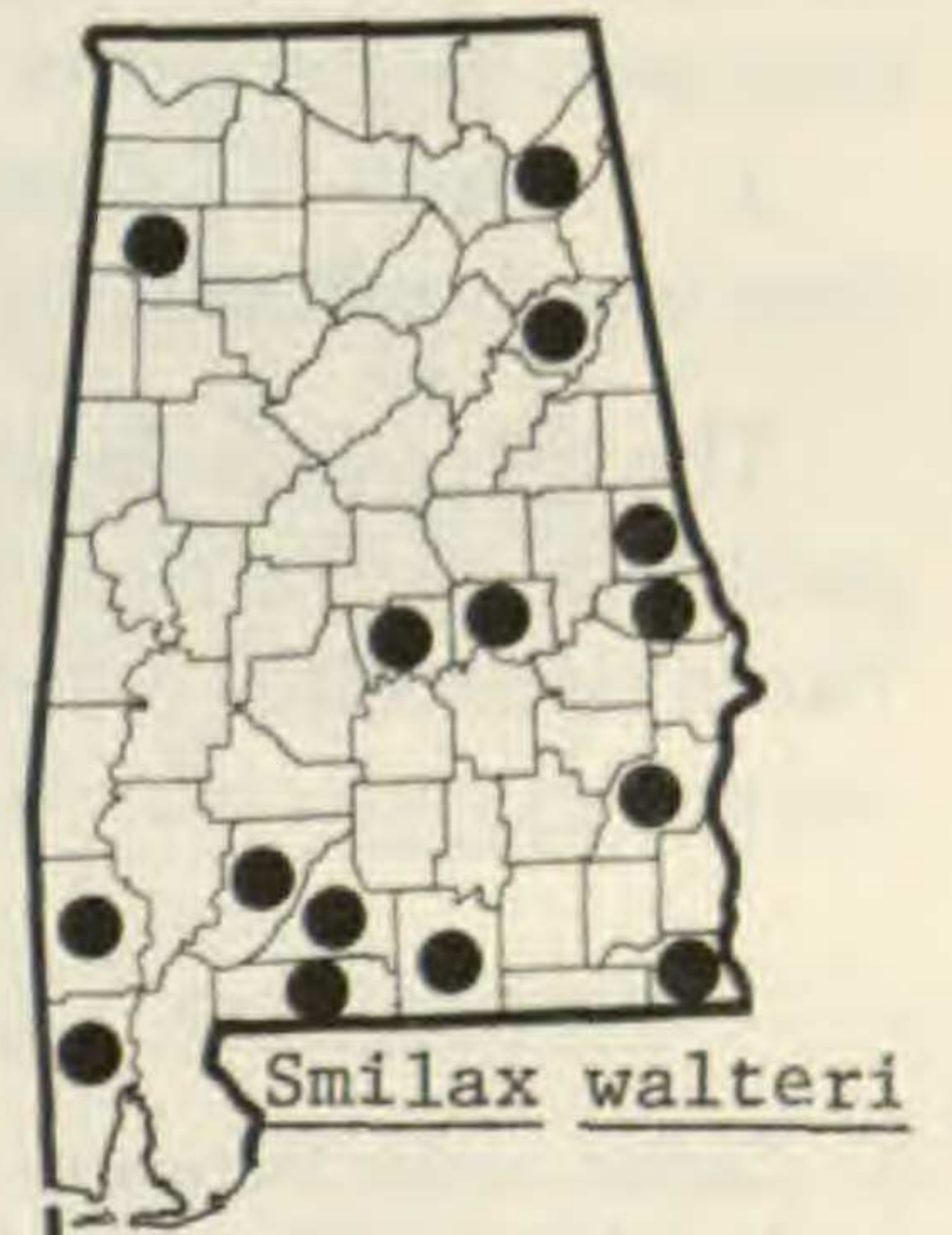
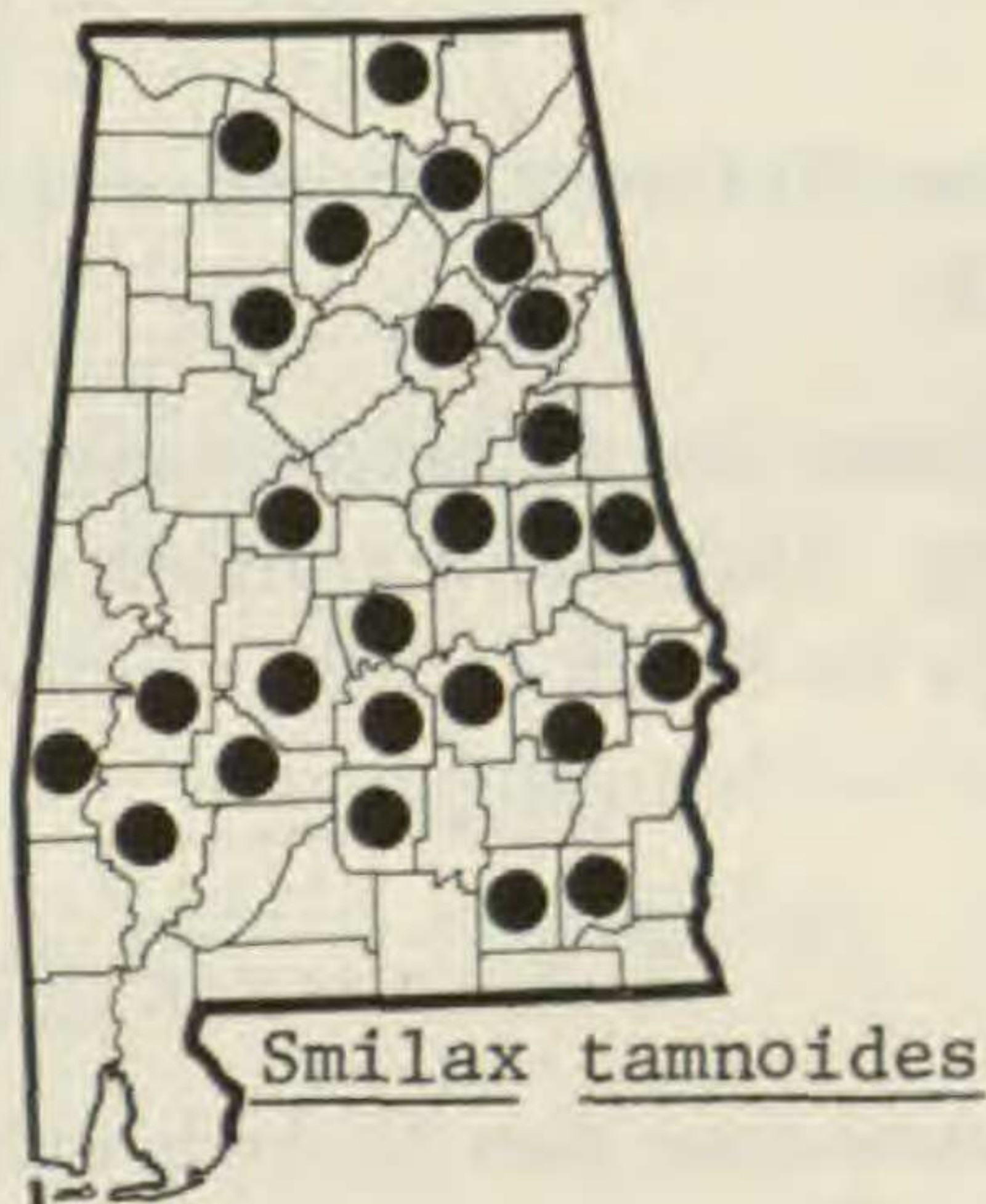
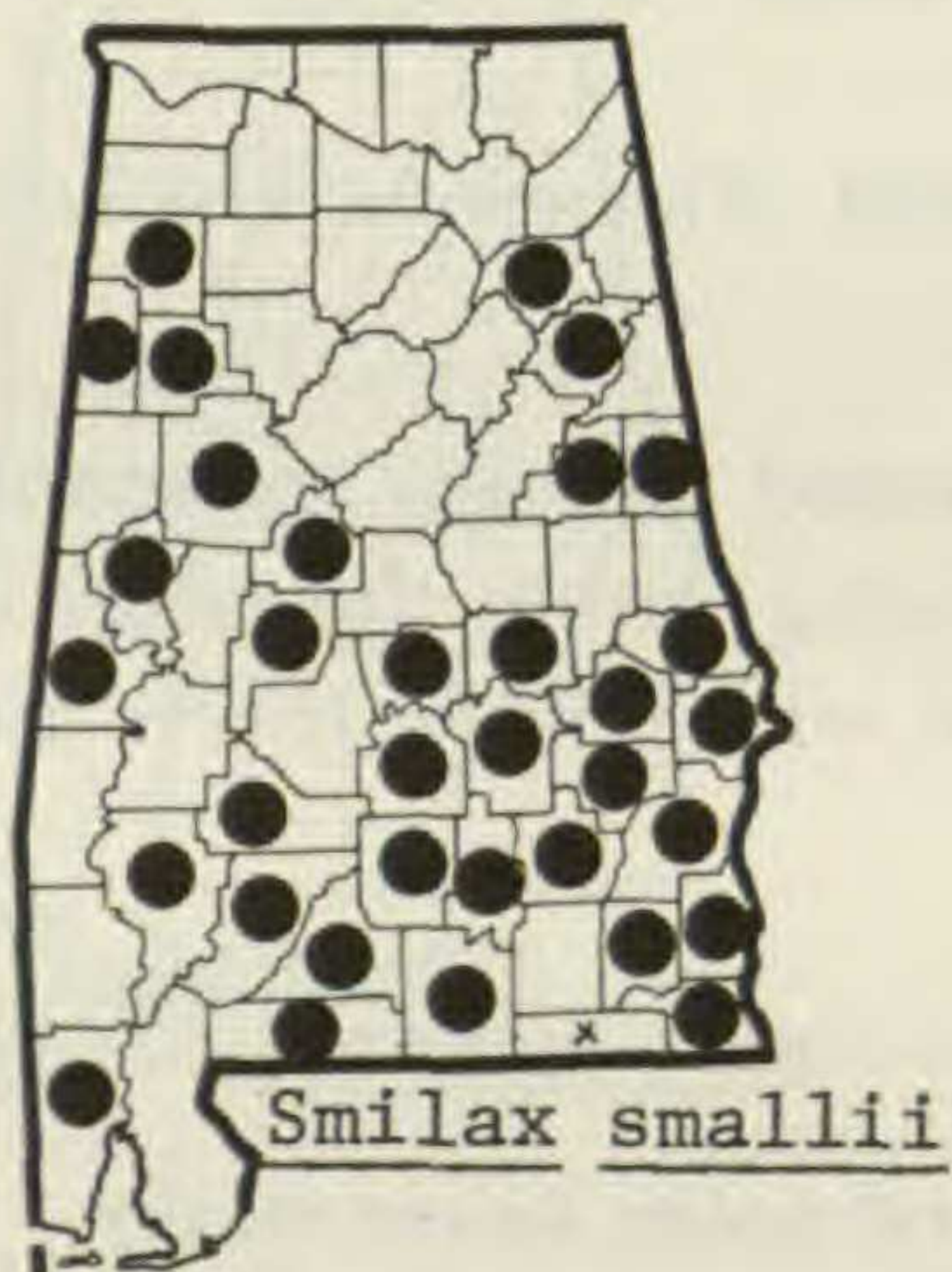
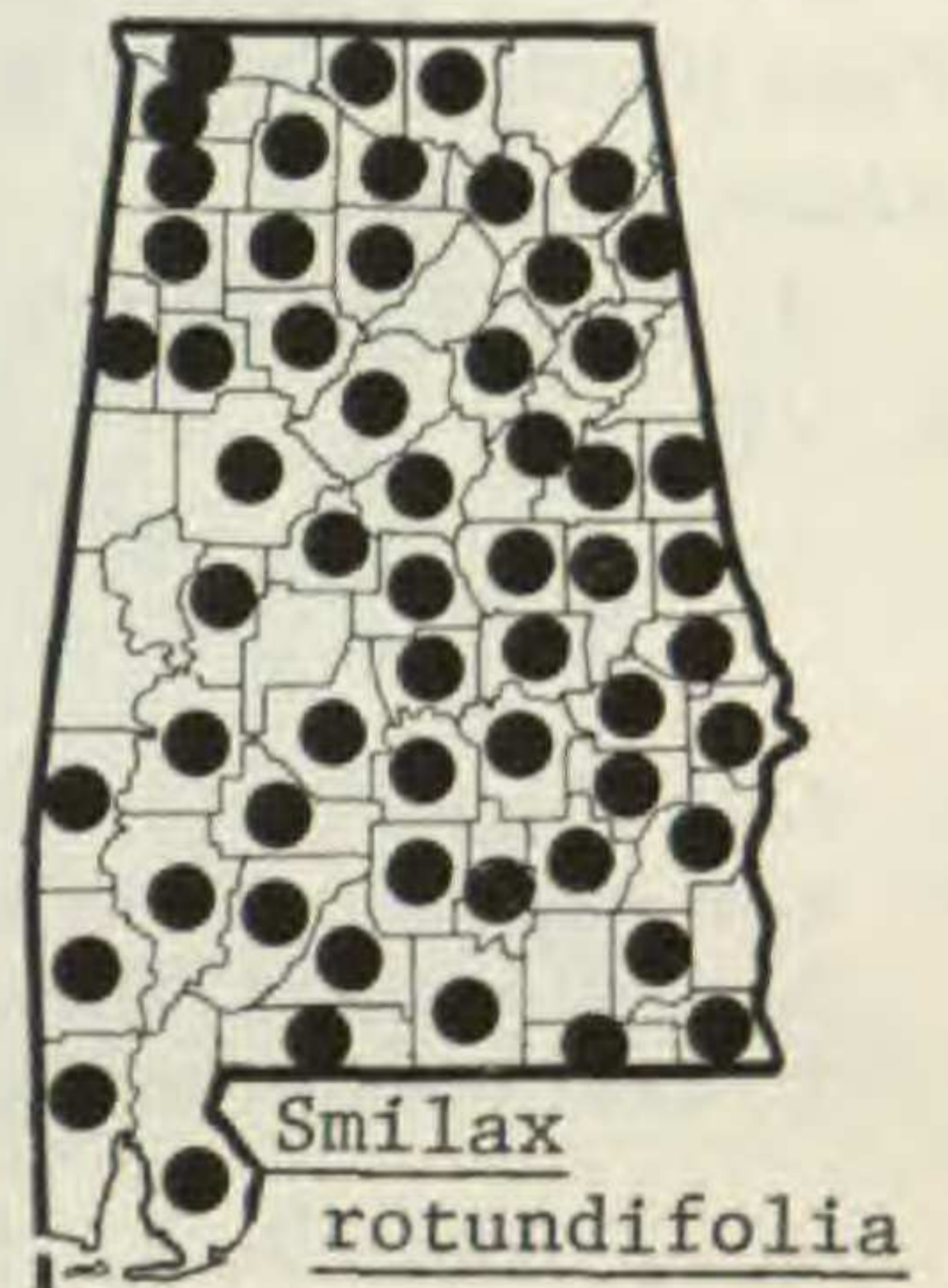
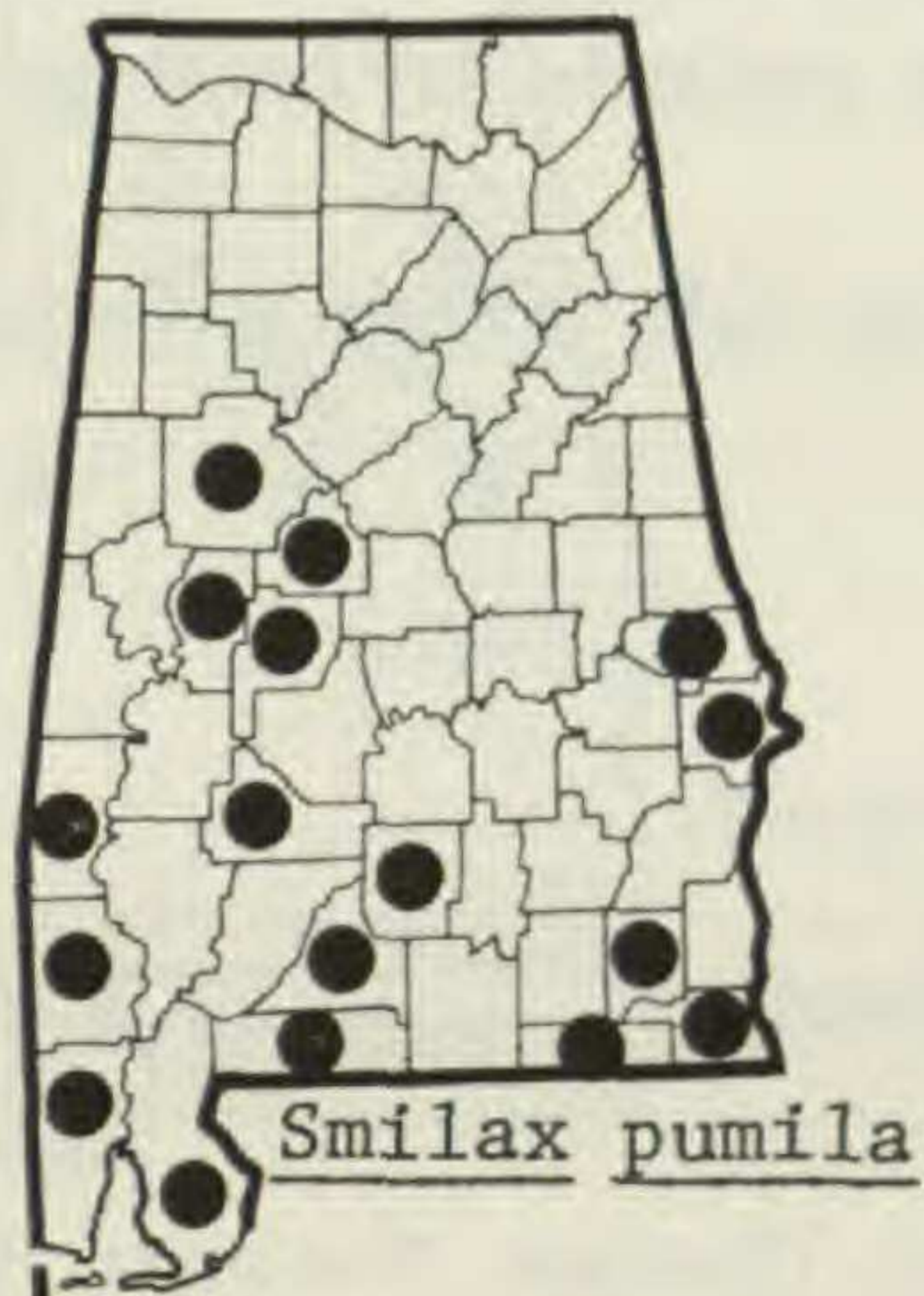
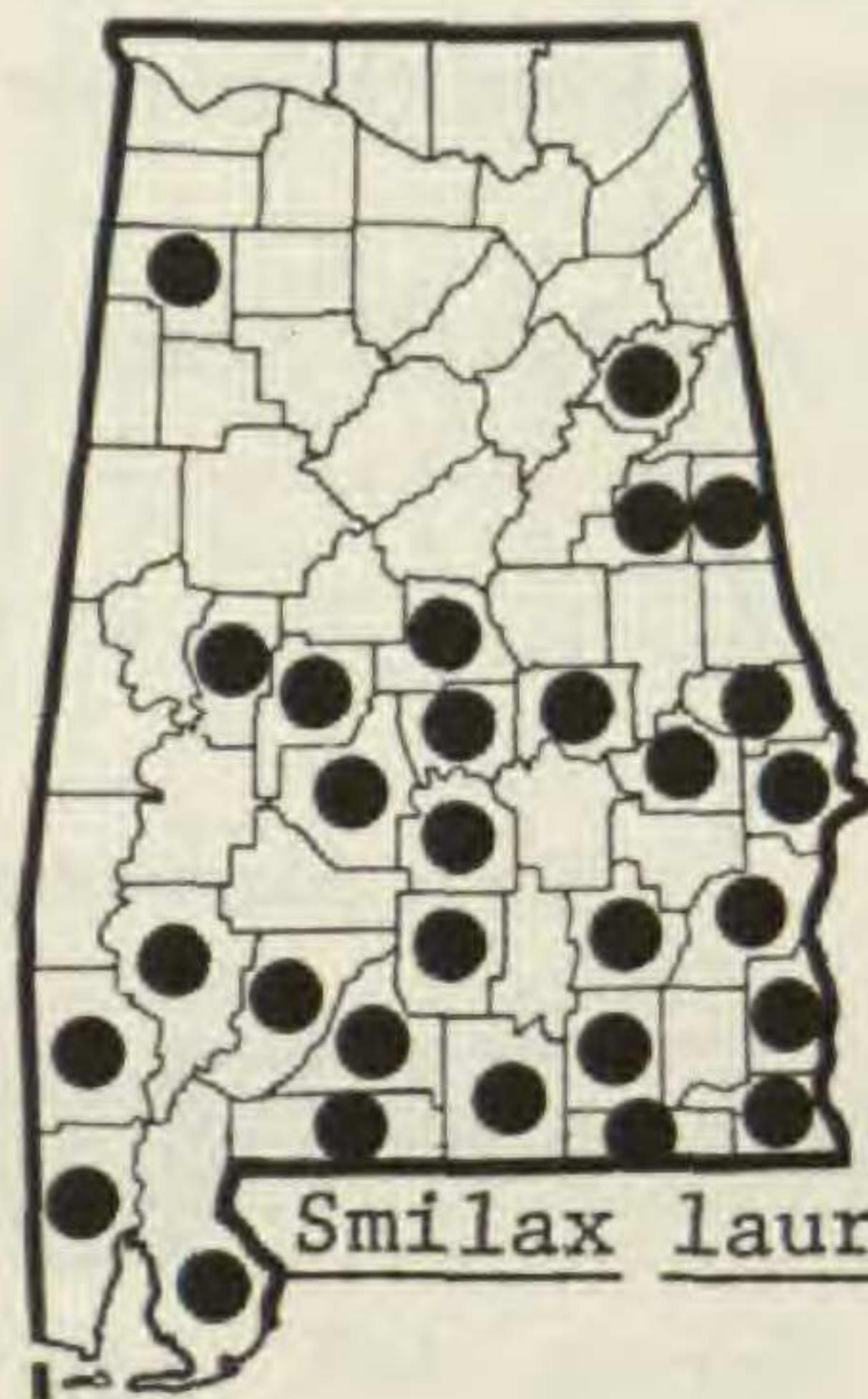
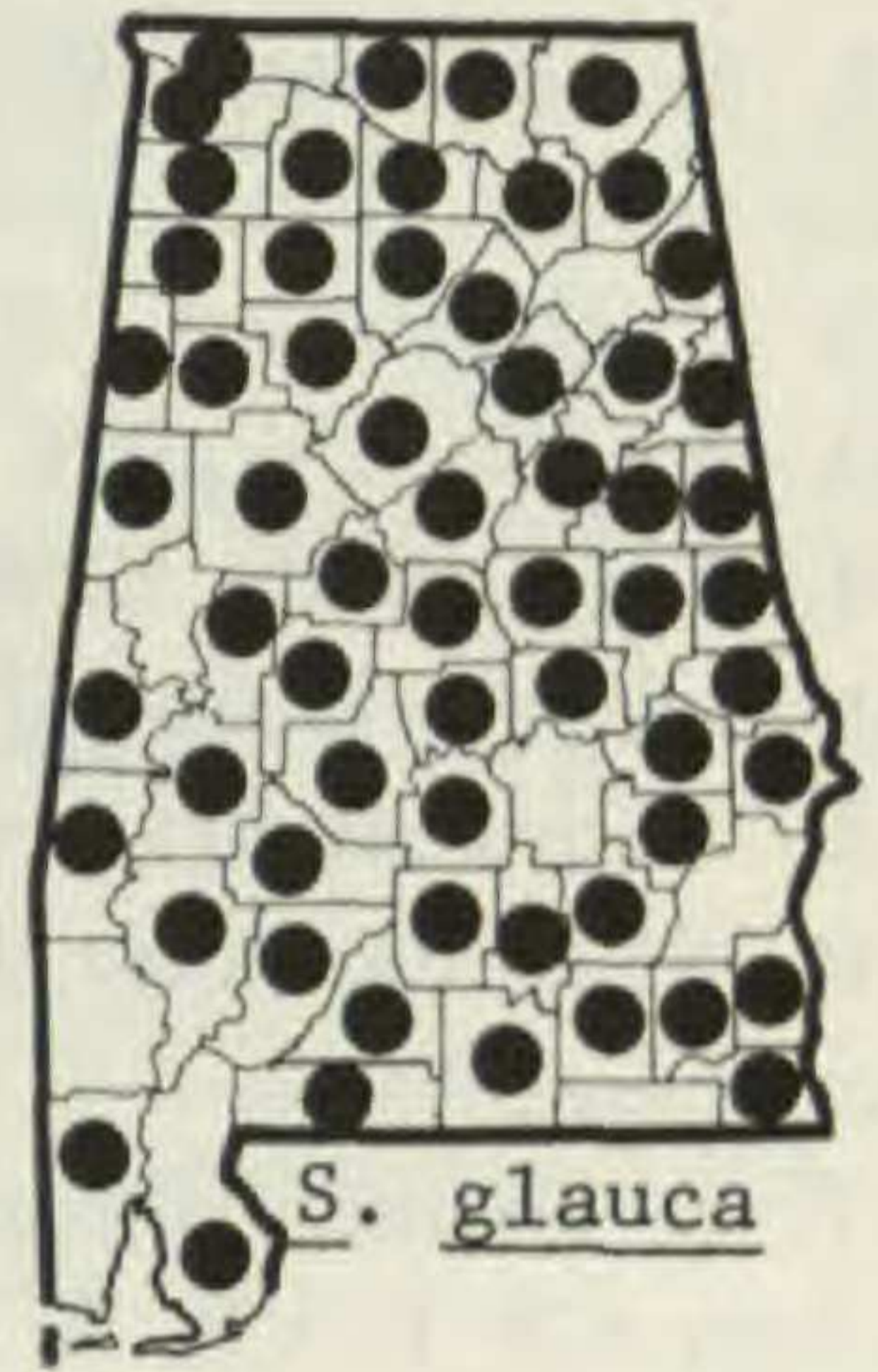
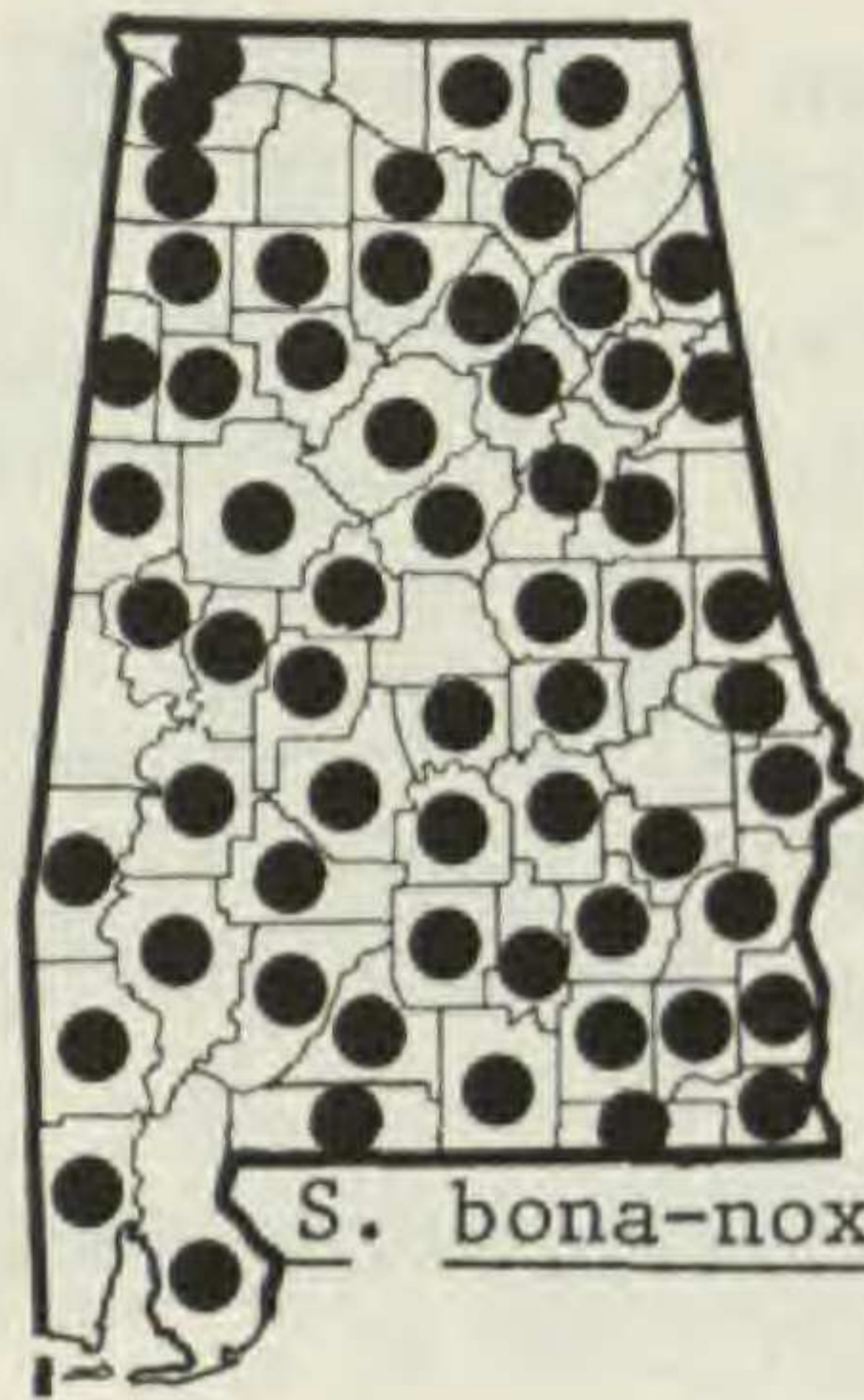
## 6. LILIACEAE

- |  |                  |
|--|------------------|
| 1. Leaves less than 1.5 dm long; inflorescences axillary ..... | 1. <i>Smilax</i> |
| 1. Leaves more than 1.5 dm long; inflorescence terminal .....  | 2. <i>Yucca</i>  |

### 1. *Smilax* L.

- |  |                           |
|--|---------------------------|
| 1. Stems and lower surfaces of leaves densely pubescent .....  | 5. <i>S. pumila</i>       |
| 1. Stems and lower surfaces of leaves glabrous or glabrate, sometimes scurfy .....                     | 2                         |
| 2. Leaves glaucous beneath, distinctly grayish to whitish .....  | 3. <i>S. glauca</i>       |
| 2. Leaves green beneath (or drying black), non-glaucous .....  | 3                         |
| 3. Fruit red or reddish .....  | 4                         |
| 4. Leaves deciduous; peduncle distinctly flattened .....   | 9. <i>S. walteri</i>      |
| 4. Leaves evergreen; peduncle terete or subterete .....  | 7. <i>S. smallii</i>      |
| 3. Fruit black or bluish-black .....   | 5                         |
| 5. Fruit maturing in second season; leaves oblong to narrowly elliptic, ex-auriculate, entire .....    | 4. <i>S. laurifolia</i>   |
| 5. Fruit maturing in first season; leaves ovate, often auriculate, or margins spinulose or erose ..... | 6                         |
| 6. Peduncles more than 1.5 times as long as the petioles of subtending leaves .....                    | 7                         |
| 7. Leaf margins thin, erose; stems hispid or unarmed .....   | 8. <i>S. tamnoides</i>    |
| 7. Leaf margins hyaline-thickened, often spinulose; stems thorny .....                                 | 2. <i>S. bona-nox</i>     |
| 6. Peduncles 1.5 times or less as long as the petioles of subtending leaves .....                      | 8                         |
| 8. Leaf margins thin .....   | 6. <i>S. rotundifolia</i> |
| 8. Leaf margins hyaline-thickened .....  | 9                         |

6. LILIACEAE



9. Petioles subtending peduncles less than 8 mm long ..... 1. *S. auriculata*  
 9. Petioles subtending peduncles more than 8 mm long ... 2. *S. bona-nox*

1. *S. auriculata* Walter, SAND BAMBOO-BRIER. Spring-summer; fall-winter. Sandy woods, dunes; principally OCP.

2. *S. bona-nox* L., BAMBOO-BRIER. Spring; fall. Habitats various; throughout.

3. *S. glauca* Walter. Spring; fall. Habitats various; throughout.

4. *S. laurifolia* L., BAMBOO. Summer; fall. Seepages, bogs, ditches, swamp ecotones; principally CP, but rare in P, AM, VR.

5. *S. pumila* Walter. Fall; spring. Sandy woods; CP and southern P.

6. *S. rotundifolia* L. Spring; fall. Deciduous woods, thickets, fencerows; throughout.

7. *S. smallii* Morong. Late spring-summer; spring. Low woods, seepages, thickets; CP, P, VR. *S. lanceolata* L.—M, H, S.

8. *S. tamnoides* L. Spring; fall. Alluvial and mesic woods, often over calcareous substrata; throughout. *S. hispida* Muhl.—S, RAB.—The application of *S. hispida* Muhl. is apparently based upon plants from north of the Coastal Plain, which generally display smaller foliage and are more densely armed. Coastal Plain plants generally occur in semialluvial habitats, which may affect their more robust aspect.

9. *S. walteri* Pursh. Spring; fall. Ditches, seepages, low woods; CP, rare in P, VR.

## 2. *Yucca* L.

- |  |                          |
|--|--------------------------|
| 1. Leaf margins with filamentous threads ..... | 2. <i>Y. filamentosa</i> |
| 1. Leaf margins entire or serrate .....        | 2                        |
| 2. Leaf margins entire or scaberulous .....    | 3. <i>Y. gloriosa</i>    |
| 2. Leaf margins serrate .....                  | 1. <i>Y. aloifolia</i>   |

1. *Y. aloifolia* L., SPANISH DAGGER, SPANISH BAYONET. Spring; fall. Sandy deciduous woods, thickets; CP.

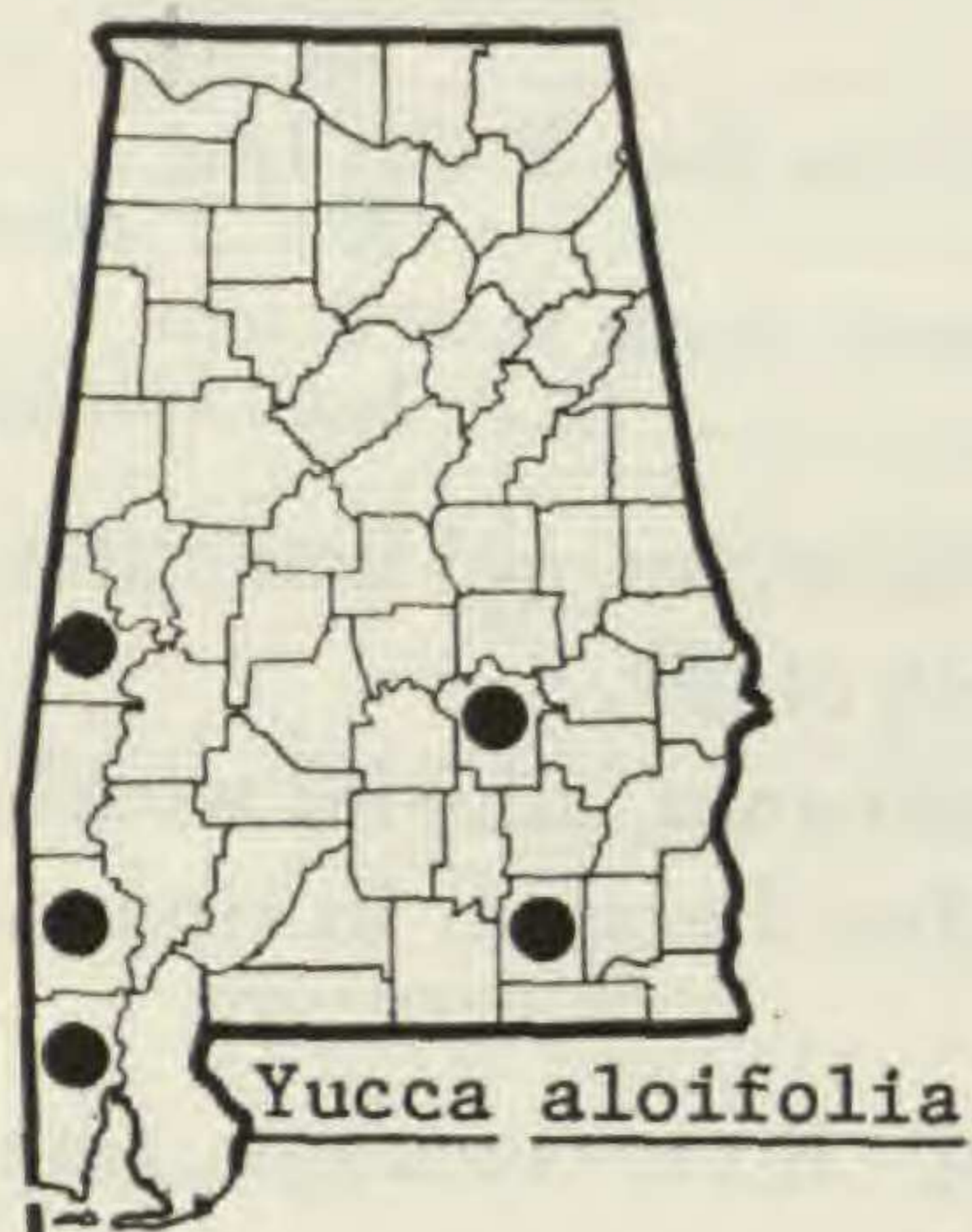
2. *Y. filamentosa* L. var. *smalliana* (Fernald) Ahles, BEARGRASS. Spring; summer-fall. Fields, fencerows, open woods; throughout. *Y. flaccida* Haw.—S.—Specimens of *Y. filamentosa* L. var. *filamentosa*, reported from Alabama, have not been seen by the writer.

3. *Y. gloriosa* L., SPANISH BAYONET. Spring-summer; fall. Fencerows, thickets, open woods; principally CP.

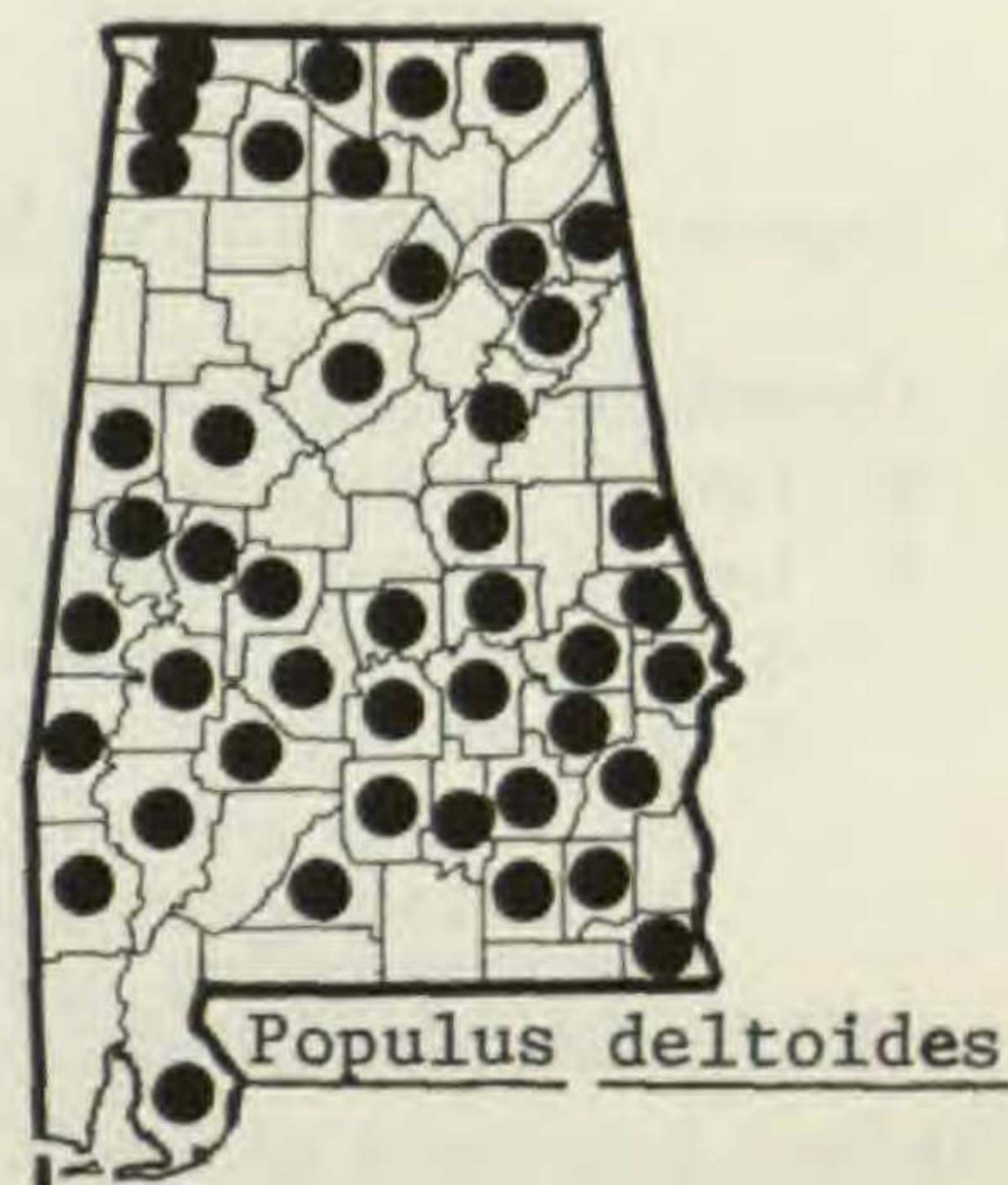
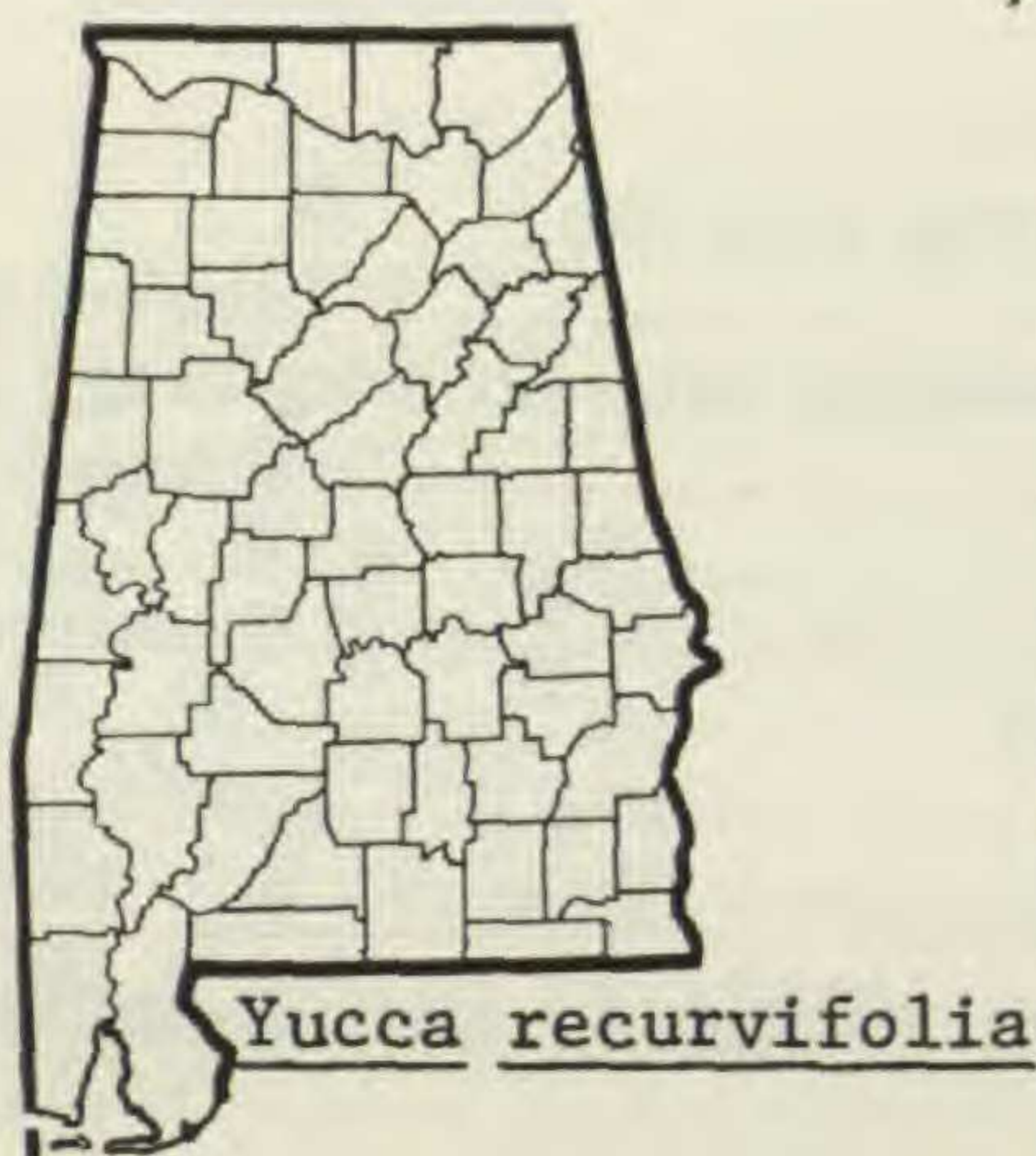
The three taxa listed above are all occasionally cultivated and are commonly persistent or rarely escaping. Alabama is considered as being within the range of *Yucca recurvifolia* Salisbury by Small (1933). Individuals with pliable leaves and winged capsules may be referable to this taxon.

## 7. SALICACEAE

- |  |                   |
|--|-------------------|
| 1. Catkin scales laciniate; stamens more than 10; buds with several scales; leaves usually less than 3 times as long as wide ..... | 1. <i>Populus</i> |
| 1. Catkin scales entire; stamens 10 or less; bud scale single; leaves usually more than 3 times as long as wide .....              | 2. <i>Salix</i>   |



7. SALICACEAE



1. *Populus* L., POPLAR

- |   |                           |
|---|---------------------------|
| 1. Petioles distinctly flattened .....  | 2. <i>P. deltoides</i>    |
| 1. Petioles terete or subterete .....   | 2                         |
| 2. Mature leaves white-tomentose or floccose beneath; capsule less than 5 mm long .....     | 1. <i>P. alba</i>         |
| 2. Mature leaves not white-tomentose or floccose beneath; capsule more than 5 mm long ..... | 3. <i>P. heterophylla</i> |

1. *P. alba* L., WHITE P., SILVER P. Spring. Thickets, fencerows, old homesites, frequently an asexual escape from planting; principally north of CP.

2. *P. deltoides* Marshall, COTTONWOOD. Spring. Streambanks, alluvial woods, river swamps; throughout, except rare on western CuP. Most frequent in circum-neutral situations. *P. balsamifera* L.—S.

3. *P. heterophylla* L., SWAMP COTTONWOOD. Spring. River swamps, rare; OCP.

*Populus nigra* L. var. *italica* DuRoi (Lombardy poplar) is rarely persistent from old stumps after cultivation.

2. *Salix* L., WILLOW

- |  |                          |
|--|--------------------------|
| 1. Capsule less than 2.5 mm long; branches quite pendulous; twigs whip-like .....          | 1. <i>S. babylonica</i>  |
| 1. Capsule more than 2.5 mm long; branches not decidedly pendulous; twigs not whip-like .. | 2                        |
| 2. Leaves entire or nearly so, commonly revolute .....                                     | 3. <i>S. humilis</i>     |
| 2. Leaves serrate to serrulate, erevolute .....  | 3                        |
| 3. Leaves and capsules sericeous; stamens 2 .....  | 5. <i>S. sericea</i>     |
| 3. Leaves and capsules not sericeous; stamens 3 or more .....                              | 4                        |
| 4. Leaves glaucous beneath .....   | 2. <i>S. caroliniana</i> |
| 4. Leaves green beneath .....  | 4. <i>S. nigra</i>       |

1. *S. babylonica* L., WEEPING W. Spring. Rare escape to stream-banks, ditches, low open ground; CP, VR.

2. *S. caroliniana* Michaux. Spring. Open streambeds, ditches, throughout, but most common in central portions of Alabama.

3. *S. humilis* Marshall, PRAIRIE W. Spring. Open, low ground, rare; CP, P, AM, CuP, HR.

4. *S. nigra* Marshall, BLACK W. Spring. Ditches, low ground and seepages; throughout.

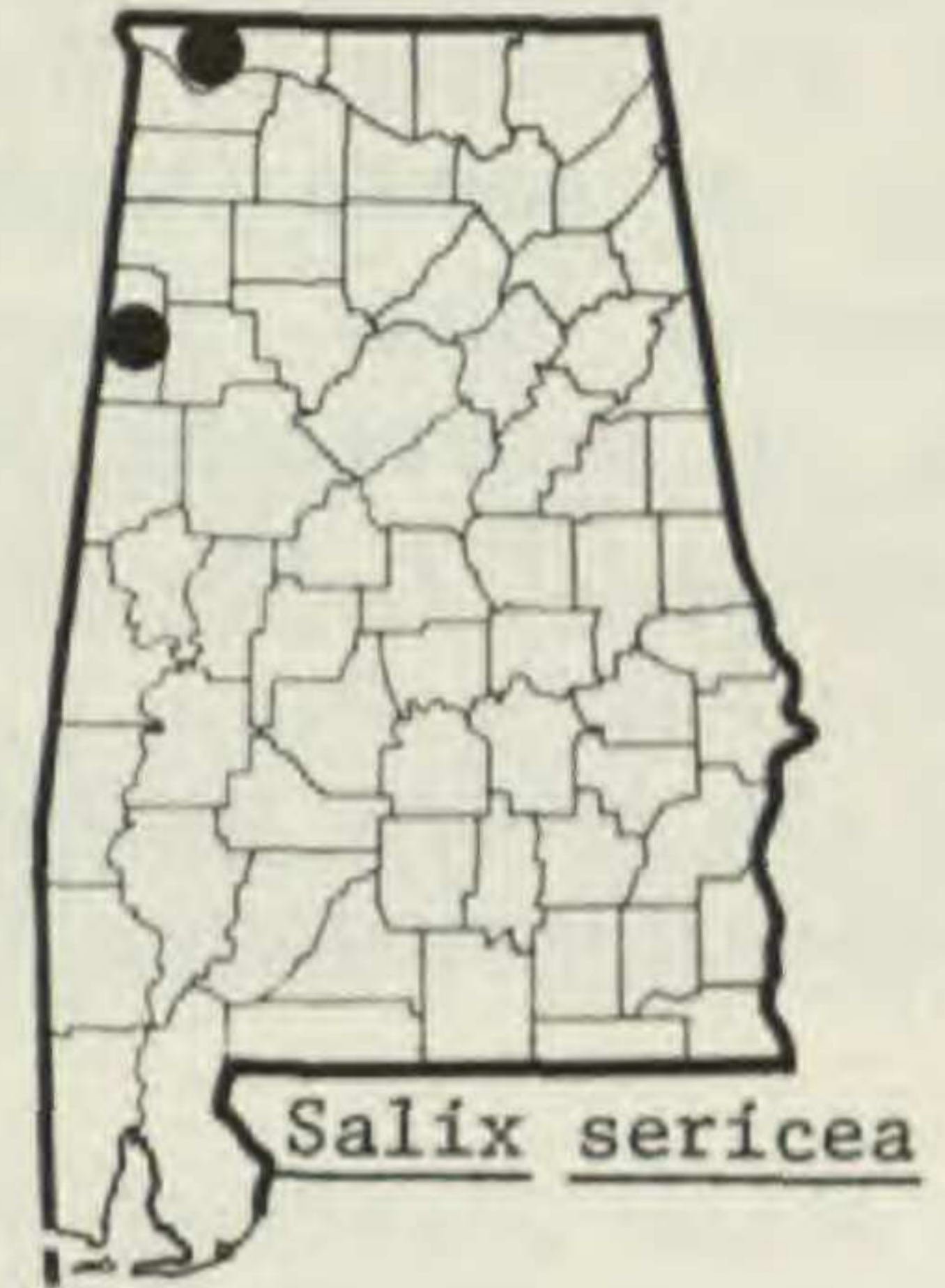
5. *S. sericea* Marshall, SILKY W. Spring. Open seepages, rare; CP. HR. *S. wardi* Bebb—M.

Further study is needed to determine the best status of *Salix marginata* Wimm. in Small (1933). This name may belong in synonymy with either *S. nigra* Marsh. or *S. caroliniana* Michx.

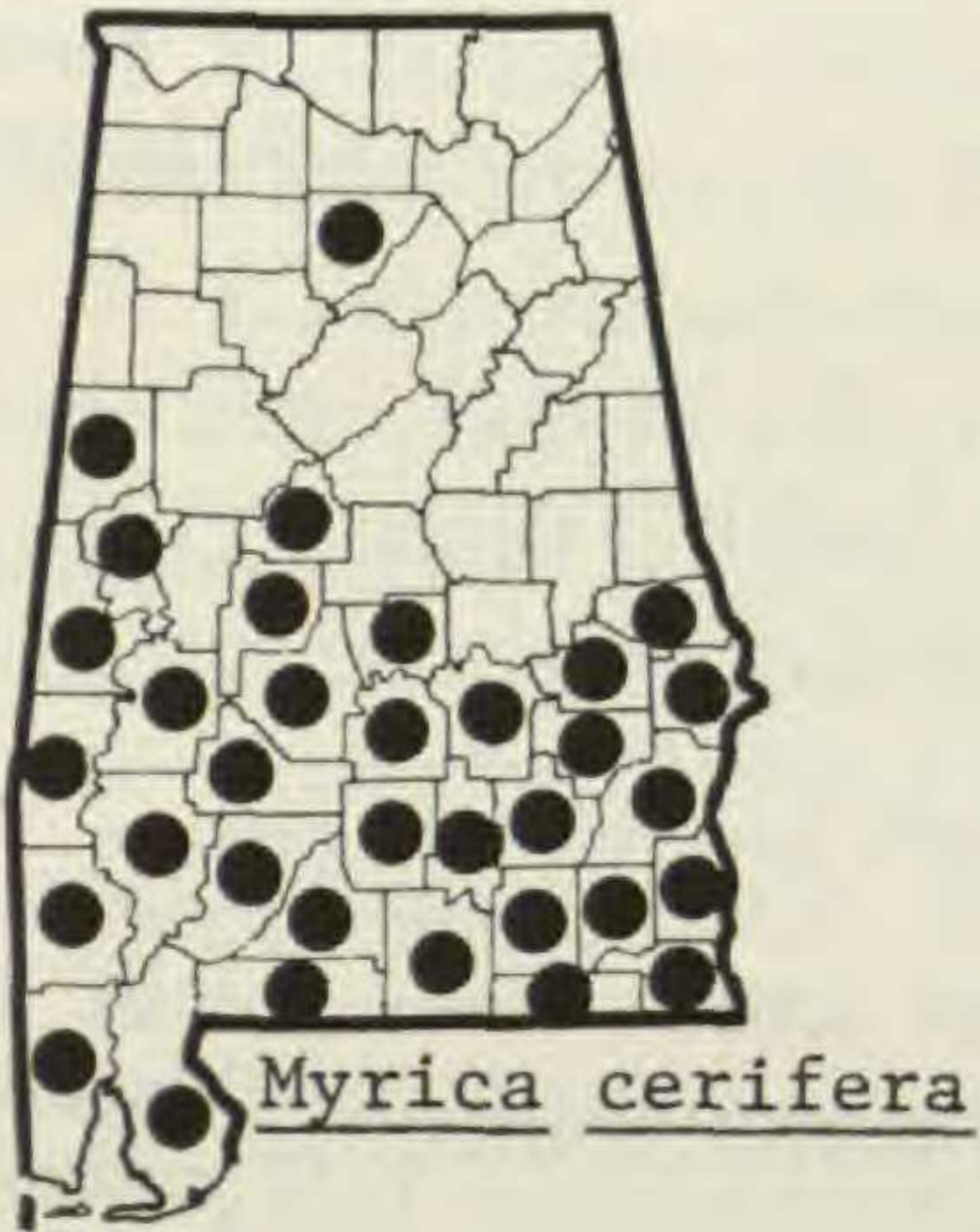
## 8. MYRICACEAE

1. *Myrica* L.

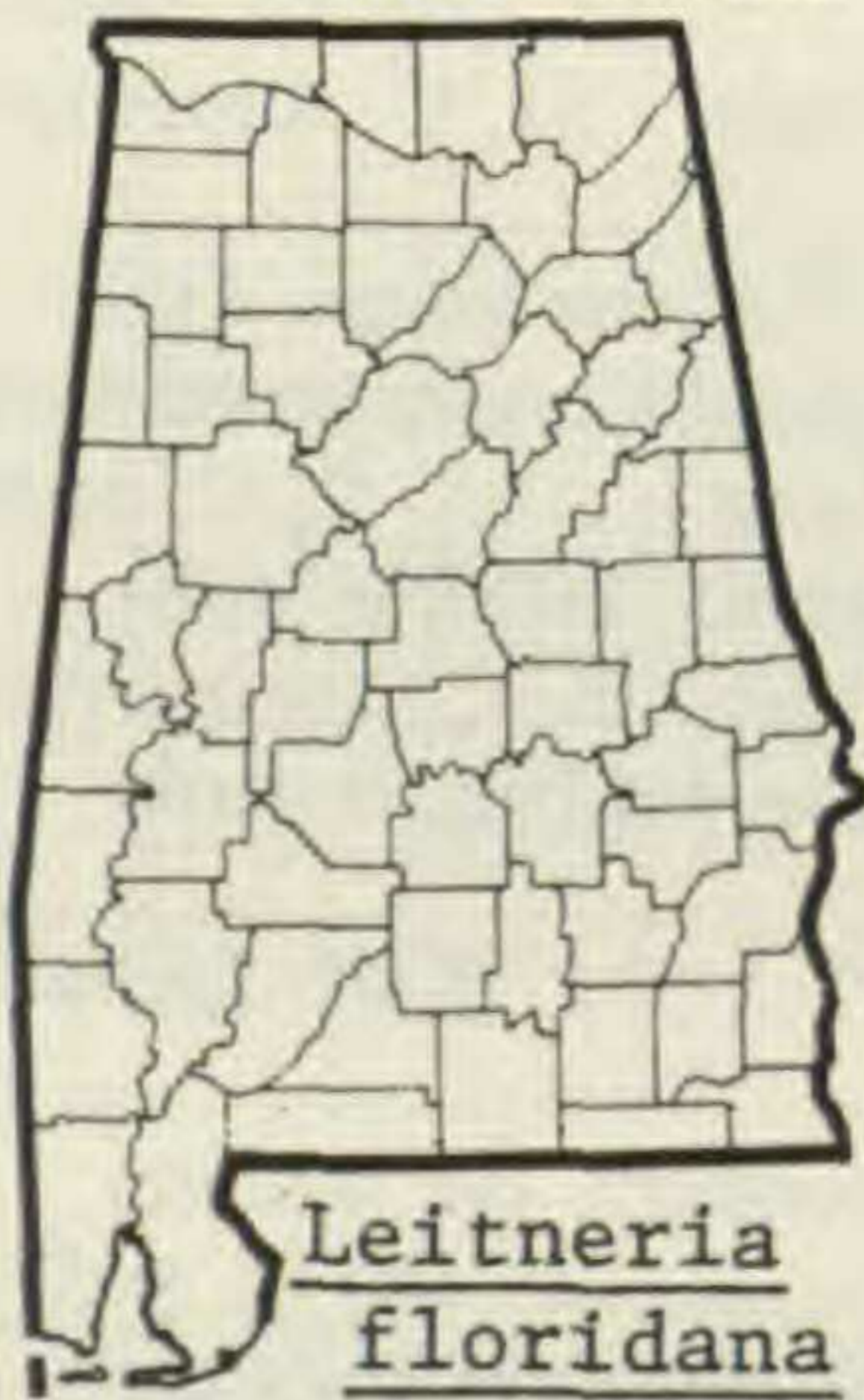
- |  |                      |
|--|----------------------|
| 1. Staminate flowers with 8 or more stamens; pistils 1–3 in each bract axil; fruit more than 1 cm long .....         | 3. <i>M. inodora</i> |
| 1. Staminate flowers with less than 7 stamens; pistil solitary in each bract axil; fruit less than 0.5 cm long ..... | 2                    |



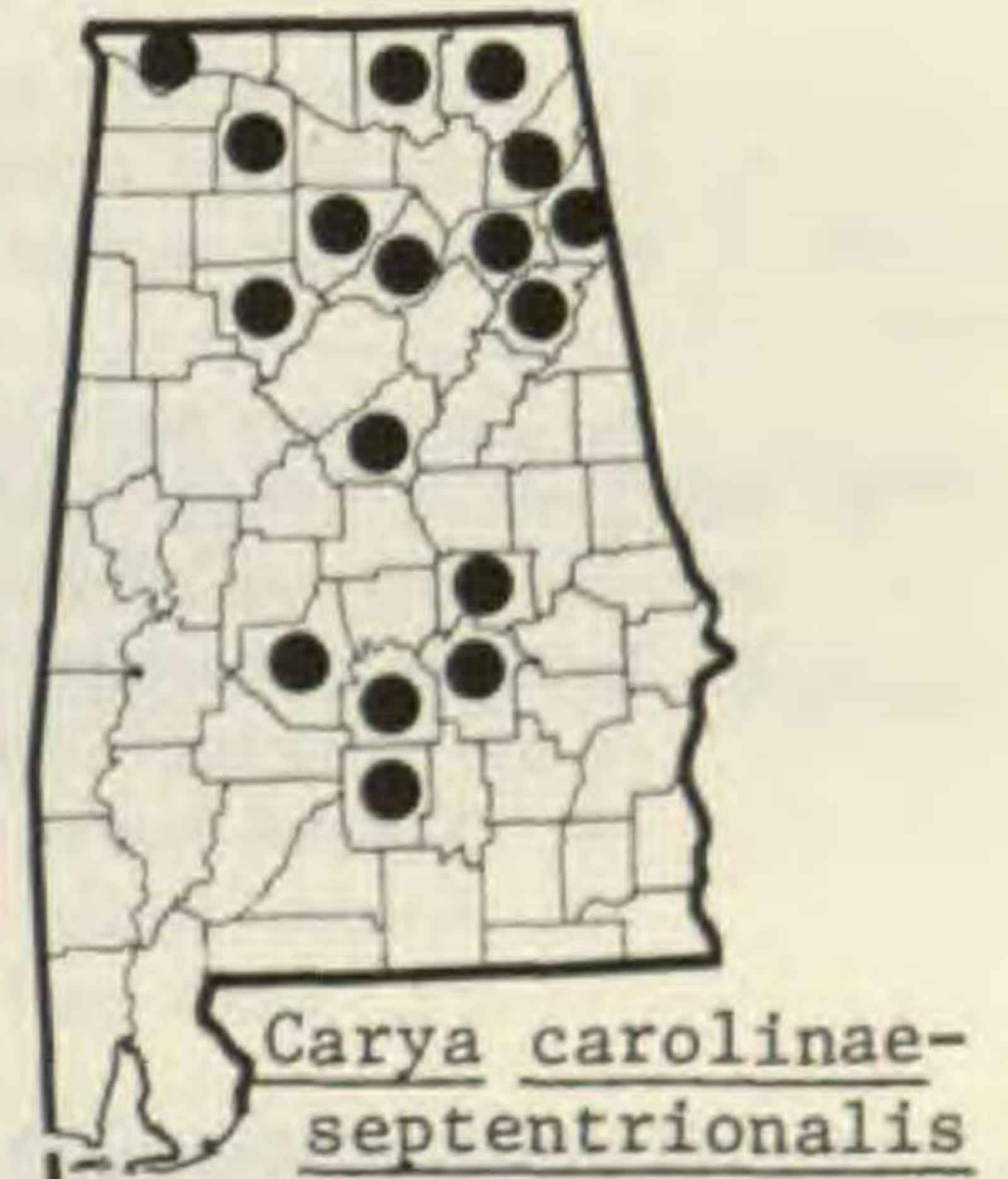
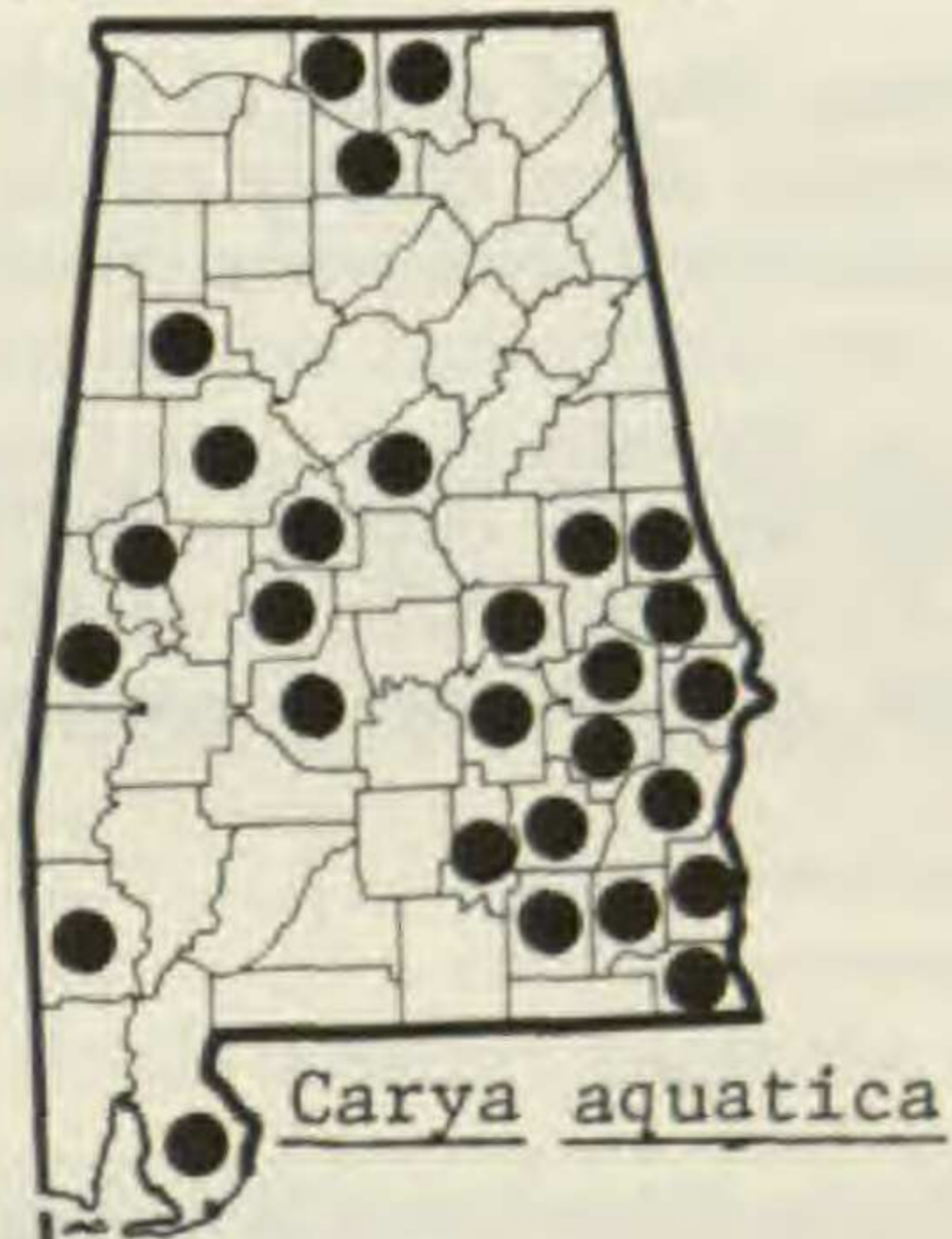
8. MYRICACEAE



LEITNERIACEAE



9. JUGLANDACEAE



2. Glands on upper leaf surface very sparse or absent ..... 2. *M. heterophylla*  
 2. Glands on upper leaf surface dense ..... 1. *M. cerifera*

1. *M. cerifera* L., WAX MYRTLE. Spring; fall. Habitats various; CP, CuP (rare). *M. pumila* (Michx.) Sm.—M, H; *Cerothamnus ceriferus* (L.) Sm.—S; *C. pumilus* (Michx.) Sm.—S.

2. *M. heterophylla* Rafinesque, BAYBERRY. Spring; fall. Seepages, bogs, infrequent; CP, P, AM, VR. *M. carolinensis* Mill.—M, H; *Cerothamnus carolinensis* (Mill.) Tidest.—S.

3. *M. inodora* Bartram. Spring; fall. Seepages, creek swamps, rare; OCP. *Cerothamnus inodorus* (Bart.) Sm.—S.

#### LEITNERIACEAE

*Leitneria floridana* Chapman (CORKWOOD) has been listed by Dean (1961), but no specimens have been seen.

#### 9. JUGLANDACEAE

1. Pith of twigs continuous; involucre dehiscent at maturity ..... 1. *Carya*  
 1. Pith of twigs chambered; involucre indehiscent ..... 2. *Juglans*

##### 1. *Carya* Nuttall, HICKORY

1. Bud scales valvate ..... 2  
 2. Buds distinctly yellow ..... 3. *C. cordiformis*  
 2. Buds brownish ..... 3  
 3. Involucre smooth, or angled only distally ..... 4  
 4. Young twigs, buds and lower surfaces of leaves entirely covered with peltate scales ..... 7. *C. myristicaeformis*  
 4. Young twigs, buds and lower surfaces of leaves not entirely covered with peltate scales ..... 5. *C. illinoensis*  
 3. Involucre angled ..... 1. *C. aquatica*  
 1. Bud scales imbricate ..... 5  
 5. Margins of young leaflets densely ciliate, older serrations ciliate or with persistent subterminal tufts of cilia ..... 6  
 6. Cilia on leaflet margins stellate, not densely tufted ..... 7  
 7. Buds and fruit glandular; peltate glands present beneath on leaflets ..... 10. *C. pallida*  
 7. Buds and fruit eglandular; abaxial glands of leaflets not peltate .. 11. *C. tomentosa*  
 6. Cilia on leaflet margins simple, often densely tufted ..... 8  
 8. Terminal leaflet lanceolate or oblanceolate; fruit less than 3.5 cm long ..... 2. *C. carolinae-septentrionalis*  
 8. Terminal leaflet ovate or obovate; fruit more than 3.5 cm long ..... 9. *C. ovata*  
 5. Margins of young leaflets not densely ciliate, older leaf serrations lacking subterminal tufts of cilia ..... 9  
 9. Leaflets pubescent beneath, the pubescence not confined to the midrib or axils of the principal veins ..... 10  
 10. Abaxial leaflet pubescence simple ..... 6. *C. laciniosa*  
 10. Abaxial leaflet pubescence stellate ..... 11  
 11. Buds and fruit glandular; peltate glands present beneath on leaflets ..... 10. *C. pallida*  
 11. Buds and fruit eglandular; abaxial glands of leaflets not peltate ..... 11. *C. tomentosa*  
 9. Leaflets glabrous beneath, pubescence when present confined to vicinity of midrib or axils of principal veins ..... 12  
 12. Buds peltate-glandular ..... 10. *C. pallida*  
 12. Buds eglandular ..... 13



13. Fruit obovoid, often stipitate; husk not splitting to base of fruit at maturity; leaves usually 5-foliolate ..... 4. *C. glabra*  
 13. Fruit globose or obovoid, not stipitate; husk splitting to base of fruit at maturity; leaves usually 7-foliolate ..... 8. *C. ovalis*

1. *C. aquatica* (Michaux f.) Nuttall, WATER H. Spring; fall. Alluvial woods, river swamps; principally CP, HR. *Hicoria aquatica* (Michx.) Britt.—M, H, S.

2. *C. carolinae-septentrionalis* (Ashe) Engler & Graebner, SCALY-BARK H. Spring; fall. Deciduous woods, more common over calcareous substrata; CP, P, VR, CuP, HR. *Hicoria carolinae-septentrionalis* (Michx.) Britt.—M, H, S.

3. *C. cordiformis* (Wang.) K. Koch, BITTERNUT H. Spring; fall. Rich or alluvial woods; CP, AM, VR, CuP, HR. *Hicoria minima* (Marsh.) Britt.—M; *H. cordiformis* (Wang.) Britt.—H, S.

4. *C. glabra* (Miller) Sweet, PIGNUT H. Spring; fall. Deciduous woods; CP, AM, VR, CuP. *Hicoria ashei* Sudw.—H; *H. glabra* (Miller) Britt.—M, H, S.

5. *C. illinoensis* (Wang.) K. Koch, PECAN. Spring; fall. Fence-rows, vacant lots, disturbed areas; principally CP. Possibly occurring naturally in the Black Belt (Harper, 1928). *Hicoria pecan* (Marsh.) Britt.—M, H, S.

6. *C. laciniosa* (Michaux f.) Loud., BIG SCALY-BARK H. Spring; fall. Rich woods, alluvial woods; CP, VR, CuP, HR. *Hicoria laciniosa* (Michx.) Sarg.—S.

7. *C. myristicaeformis* Michaux f., NUTMEG H. Spring; fall. Calcareous soil, rare; Black Belt of CP. *Hicoria myristicaeformis* (Michx.) Britt.—M, H, S.

8. *C. ovalis* (Miller) K. Koch, PIGNUT H. Spring; fall. Deciduous woods, very rare, but poorly collected; CuP. *Hicoria microcarpa* (Nutt.) Britt.—S.

9. *C. ovata* (Miller) K. Koch, SCALY-BARK H. Spring; fall. Mesic woods, low woods, alluvial woods, river swamps; throughout. *Hicoria ovata* (Mill.) Britt.—M, H, S.

10. *C. pallida* (Ashe) Engler & Graebner. Spring; fall. Dry or sandy woods; throughout. *Hicoria villosa* (Sarg.) Ashe—M; *H. pallida* Ashe—H, S.

11. *C. tomentosa* (Poiret) Nuttall, MOCKERNUT H., WHITE H., WHITE-HEART H. Spring; fall. Deciduous woods in various habitats; throughout. *Hicoria alba* (L.) Britt.—M, H, S.

## 2. *Juglans* L., WALNUT

1. Pith dark brown; fruit elliptic, subcylindric or ovoid ..... 1. *J. cinerea*  
 1. Pith cream-colored, tan or light brown; fruit subglobose ..... 2. *J. nigra*

1. *J. cinerea* L., BUTTERNUT, WHITE W. Spring; fall. Rich deciduous woods, infrequent; CP (rare), CuP, HR. *Wallia cinerea* (L.) Alef.—S.

2. *J. nigra* L., WALNUT, BLACK W. Spring; fall. Rich woods; throughout. *Wallia nigra* (L.) Alef.—S.

## 10. BETULACEAE

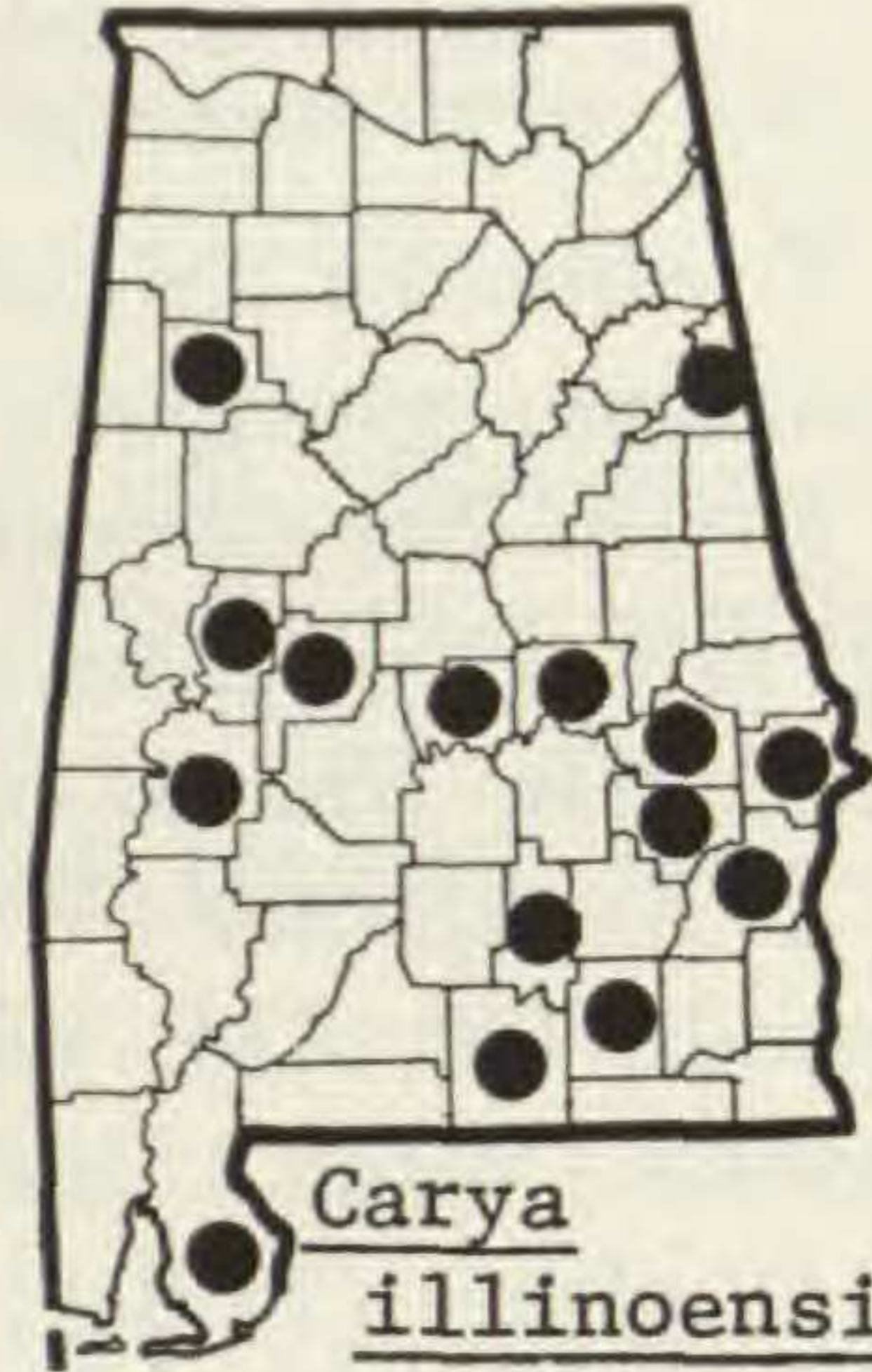
1. Fruiting pistillate bracts brownish or less than 5 mm long; calyx of staminate flower present ..... 2  
 2. Fruiting bracts woody; pistillate inflorescence persistent; stamens more than 2 ..... 1. *Alnus*  
 2. Fruiting bracts chartaceous; pistillate inflorescence disintegrating at maturity; stamens 2 ..... 2. *Betula*  
 1. Fruiting pistillate bracts green, more than 5 mm long; calyx of staminate flower absent ..... 3



Carya cordiformis



Carya glabra



Carya illinoensis



Carya laciniosa



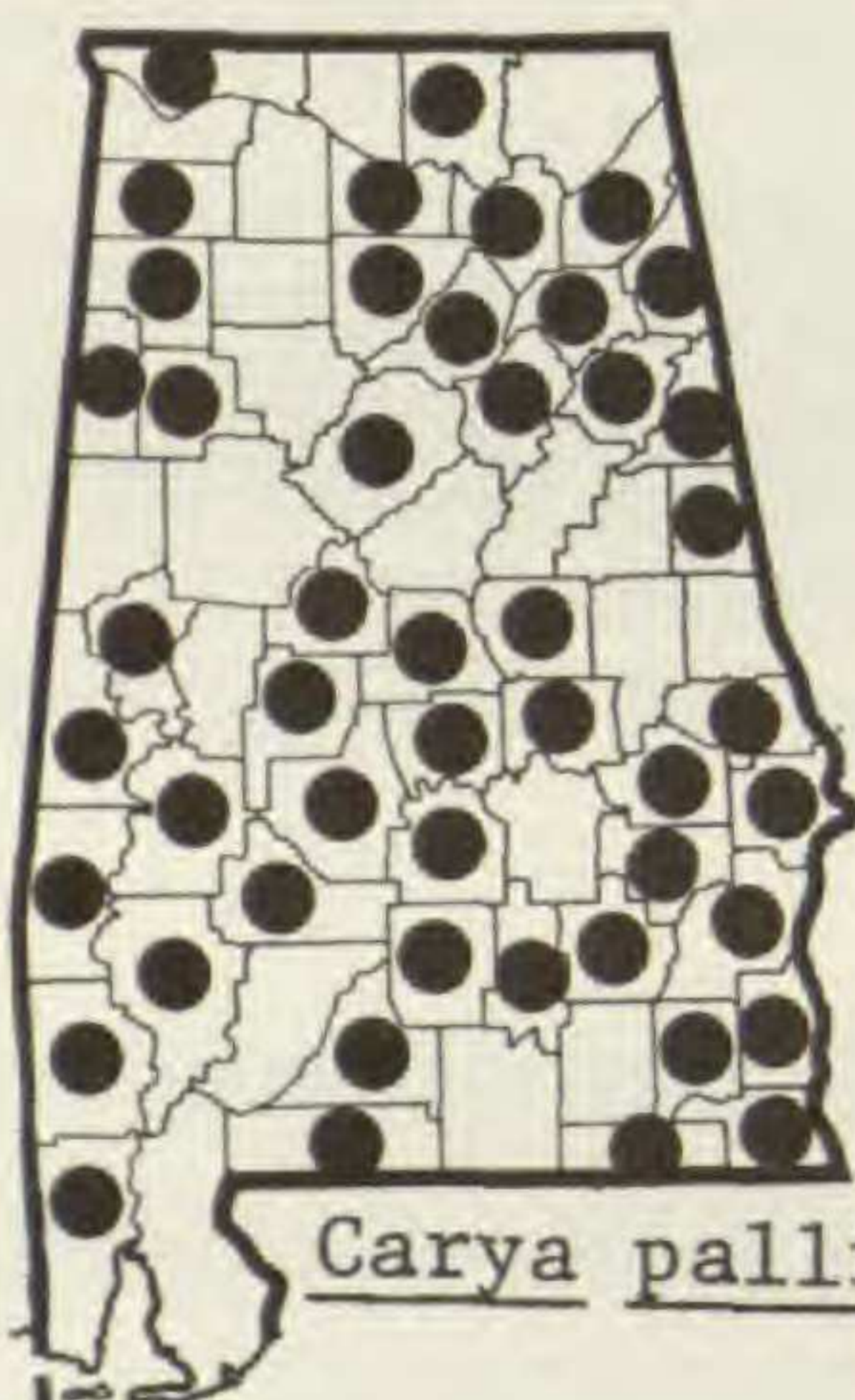
Carya myristicaeformis



Carya ovalis



Carya ovata



Carya pallida



Carya tomentosa

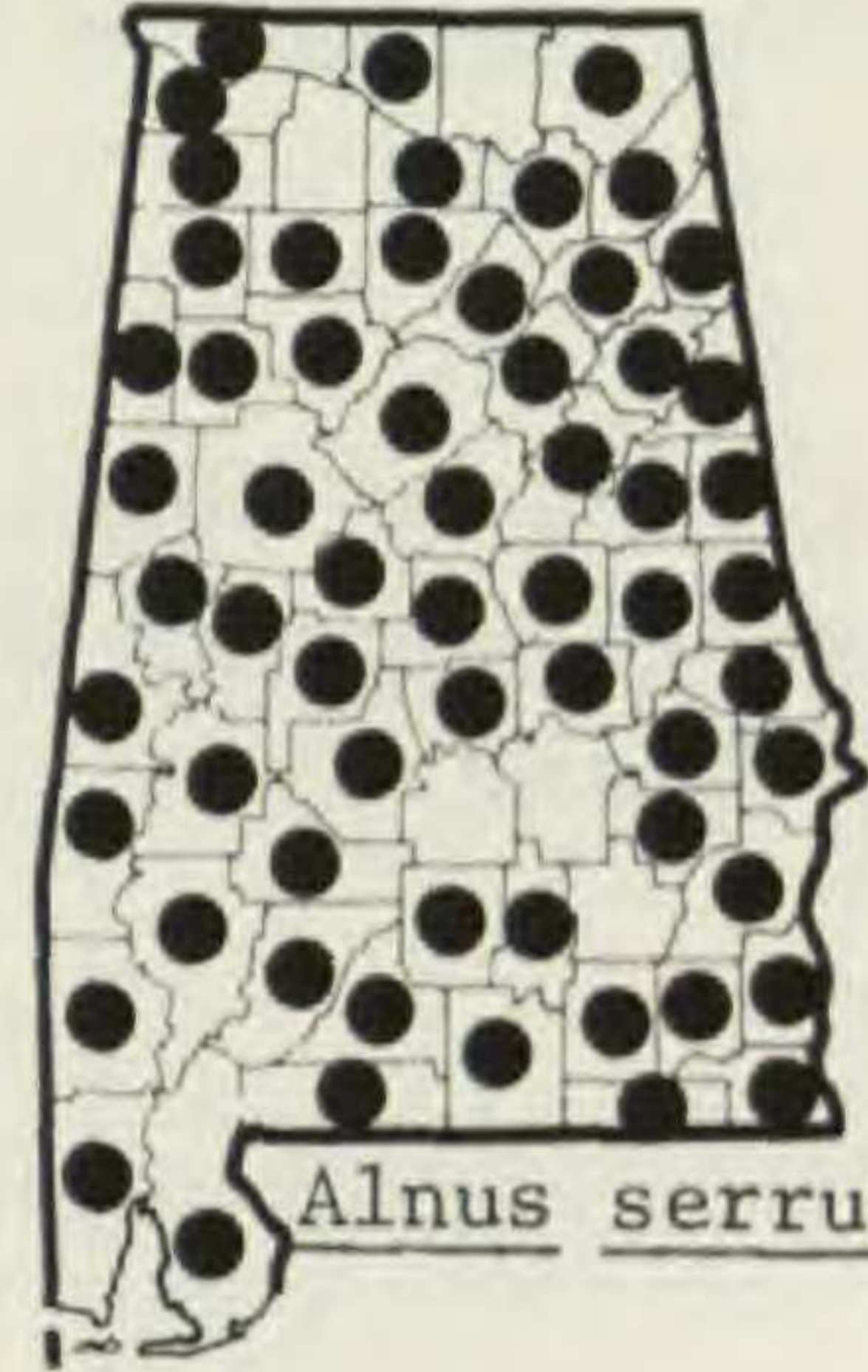
10. BETULACEAE



Juglans cinerea



Juglans nigra



Alnus serrulata



Betula lenta



Betula nigra



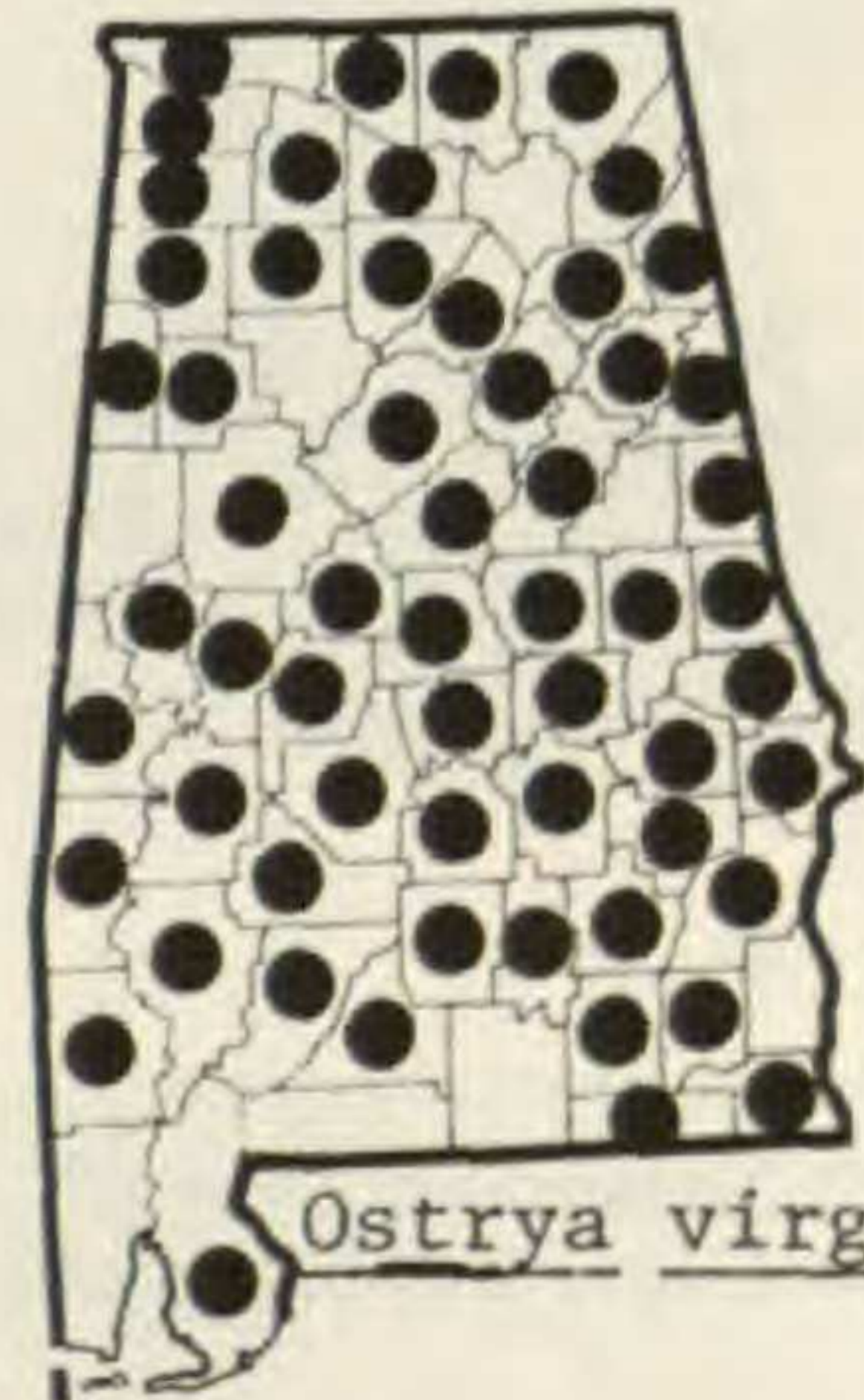
Carpinus caroliniana



Corylus americana



Corylus cornuta



Ostrya virginiana

3. Shrubs; fruit 1 cm or more long; pistillate flowers in heads ..... 4. *Corylus*  
 3. Trees; fruit less than 1 cm long; pistillate flowers in catkins ..... 4  
 4. Fruit enclosed by bladder-like bract; apex of staminate bract awned ..... 5. *Ostrya*  
 4. Fruit subtended by 3-lobed, leaf-like bract; apex of staminate bract acute .....  
 ..... 3. *Carpinus*

### 1. *Alnus* Ehrhart, ALDER

1. *A. serrulata* (Aiton) Willd. Late winter-spring; fall. Low thickets, stream-banks, ditches, seepages; throughout. *A. rugosa* (DuRoi) Koch—M, H; *A. rugosa* (DuRoi) Spreng.—S.

### 2. *Betula* L., BIRCH

1. Leaf bases, at least some, subcordate to cordate ..... 1. *B. lenta*  
 1. Leaf bases widely cuneate to truncate, not subcordate or cordate ..... 2. *B. nigra*

1. *B. lenta* L., CHERRY B. Spring; summer. Rocky woods, infrequent; AM, CuP.

2. *B. nigra* L., RIVER B. Spring; summer. Seepages, low thickets, alluvial woods, streambanks; throughout.

### 3. *Carpinus* L., IRONWOOD, BLUE BEECH

1. *C. caroliniana* Walter. Spring; fall. Streambanks, low woods; throughout.

### 4. *Corylus* L., HAZELNUT

1. Petioles stipitate-glandular ..... 1. *C. americana*  
 1. Petioles not stipitate-glandular ..... 2. *C. cornuta*

1. *C. americana* Walter. Late winter; fall. Deciduous woods, more frequent in circumneutral soils; AM, VR, CuP, HR.

2. *C. cornuta* Marshall. Late winter; fall. Dry woods, infrequent; AM, CuP. *C. rostrata* Ait.—M, H.

### 5. *Ostrya* Scop., HOP-HORNBEAM

1. *O. virginiana* (Miller) K. Koch. Spring; summer-fall. Mesic or alluvial woods; throughout.

## II. FAGACEAE

1. Involucre dehiscent, spiny ..... 2  
 2. Fruit solitary in involucre, trigonous ..... 2. *Fagus*  
 2. Fruit 2 or more per involucre, or solitary and terete ..... 1. *Castanea*  
 1. Involucre indehiscent, scaly ..... 3. *Quercus*

### 1. *Castanea* Miller

1. Leaves glabrous beneath, or sparsely pubescent on the midvein ..... 1. *C. dentata*  
 1. Leaves pubescent beneath, often densely so ..... 2  
 2. Involucres 2 or more at base of inflorescence, later appearing spicate; fruit solitary in involucre ..... 2. *C. pumila* complex  
 2. Involucre solitary at base of inflorescence, later appearing axillary-solitary; fruit 2 or more in an involucre ..... 3. *C. sativa*

1. *C. dentata* (Marshall) Borkh., CHESTNUT. Late spring-summer; fall. Dry

11. FAGACEAE



*Castanea dentata*



*Castanea pumila*  
s. l.



*Castanea sativa*



*Fagus grandifolia*



*Quercus alba*



*Quercus*  
*arkansana*



*Quercus bicolor*



*Quercus chapmanii*



*Quercus coccinea*

deciduous woods, infrequent to rare, formerly more common; CP (rare), AM, VR, CuP, HR.

2. *C. pumila* (L.) Miller, complex, CHINQUAPIN, CHINKAPIN. Late spring–summer; fall. Thickets, various habitats; throughout. *C. ashei* Sudw., *C. floridana* (Sarg.) Ashe—S; *C. alnifolia* Nutt.—S, RAB; *C. alnifolia* var. *floridana* Sarg., *C. pumila* var. *ashei* Sudw.—RAB.

3. *C. sativa* Miller, CHINESE CHESTNUT. Late spring–summer; fall. Rights-of-way, waste places, escaped or persistent, rare; CP, CuP.

*Castanea alabamensis* Ashe, from several localities in Alabama, has been regarded as a probable hybrid (Logue, 1967) involving *C. dentata* (Marsh.) Borkh. and a member of the *Pumilae* complex. This writer is inclined to agree, until substantial evidence to the contrary is produced.

## 2. *Fagus* L., BEECH

1. *F. grandifolia* Ehrhart. Spring; fall. Mesic or low woods; throughout. *F. americana* (Muenchh.) Sw.—M.

## 3. *Quercus* L., OAK

- |   |                           |
|---|---------------------------|
| 1. Leaves unlobed .....   | 2                         |
| 2. Leaves pubescent or scurfy beneath .....   | 3                         |
| 3. Leaves marginally or apically tipped with bristles more than 1 mm long .....   | 4                         |
| 4. Leaves spatulate, widest near the distal end .....   | 5                         |
| 5. Twigs densely stellate-pubescent .....   | 17. <i>Q. myrtifolia</i>  |
| 5. Twigs not densely stellate-pubescent .....   | 15. <i>Q. marilandica</i> |
| 4. Leaves lanceolate, elliptic or narrowly ovate, widest near the middle or proximal end .....                            | 6                         |
| 6. Fruit maturing on growth of present season; plants strongly soboliferous, shrubby .....                                | 23. <i>Q. pumila</i>      |
| 6. Fruit maturing on growth of last year; plant arborescent, not soboliferous ..  | 7                         |
| 7. Stellate trichomes on lower surfaces of leaves spreading ..  | 9. <i>Q. imbricaria</i>   |
| 7. Stellate trichomes on lower surfaces of leaves tightly appressed .....   | 10. <i>Q. incana</i>      |
| 3. Leaves lacking marginal bristles, sometimes with mucronate marginal teeth .....  | 8                         |
| 8. Distal bracts of involucre caudate; peduncles more than 2 cm long .....  | 3. <i>Q. bicolor</i>      |
| 8. Distal bracts of involucre obtuse, acute or acuminate; or peduncles less than 2 cm long .....                          | 9                         |
| 9. Upper $\frac{1}{3}$ of fruit glabrous, lustrous; pubescence on fruit (if any) confined to vicinity of style base ..... | 10                        |
| 10. Involucre 2 cm or more broad from rim to rim; leaf margin regularly sinuate-dentate .....                             | 16. <i>Q. montana</i>     |
| 10. Involucre less than 1 cm broad from rim to rim; leaf margin entire, asymmetrical or weakly lobed .....                | 6. <i>Q. durandii</i>     |
| 9. Upper $\frac{1}{3}$ (or more) of fruit scurfy, dull .....  | 11                        |
| 11. Leaves regularly sinuate-dentate .....  | 12                        |
| 12. Leaves pubescent beneath with tightly appressed, whitish, sessile, stellate trichomes .....                           | 21. <i>Q. prinoides</i>   |
| 12. Leaves tomentose beneath with ascending simple or stellate tawny trichomes .....                                      | 22. <i>Q. prinus</i>      |
| 11. Leaves entire or asymmetrical .....   | 13                        |

13. Fruit 2 or more times longer than broad; interior of involucrel cup funnellform, enclosing less than  $\frac{1}{2}$  of fruit ..... 28. *Q. virginiana*
13. Fruit less than 2 times as long as broad; interior of involucrel cup saucer-shaped, enclosing more than  $\frac{1}{2}$  of fruit ..... 4. *Q. chapmanii*
2. Leaves glabrous beneath, or pubescent only near the principal veins ..... 14
14. Leaves spatulate to obovate with an obtuse apex, widest near the distal end ..... 15
15. Twigs glabrate ..... 18. *Q. nigra*
15. Twigs densely stellate-pubescent ..... 16
16. Leaves coriaceous, semi-evergreen, often involute ..... 17. *Q. myrtifolia*
16. Leaves thin, deciduous, flattened to the margin ..... 2. *Q. arkansana*
14. Leaves lanceolate to obovate with an acute apex, usually widest near the middle ..... 17
17. Twigs densely stellate-pubescent ..... 17. *Q. myrtifolia*
17. Twigs glabrate ..... 18
18. Leaves narrowly elliptic or lanceolate to oblanceolate, deciduous ..... 20. *Q. phellos*
18. Leaves elliptic to obovate, semi-evergreen ..... 12. *Q. laurifolia*
1. Leaves lobed ..... 19
19. Leaves marginally or apically tipped with bristles; fruit maturing on growth of last year ..... 20
20. Leaves pubescent or scurfy beneath ..... 21
21. Distal bracts of involucrel cup inrolled under fruit ..... 11. *Q. laevis*
21. Distal bracts of involucrel cup free of fruit ..... 22
22. Leaves pubescent beneath with densely matted trichomes; involucrel cup enclosing less than  $\frac{1}{2}$  of fruit ..... 7. *Q. falcata*
22. Leaves pubescent beneath with non-matted trichomes; involucrel cup enclosing more than  $\frac{1}{2}$  of fruit ..... 27. *Q. velutina*
20. Leaves glabrous beneath, or pubescent only near the principal veins ..... 23
23. Lateral lobes (on entire leaf) 2 or less ..... 24
24. Twigs glabrate ..... 18. *Q. nigra*
24. Twigs densely stellate-pubescent ..... 2. *Q. arkansana*
23. Lateral lobes more than 3 ..... 25
25. Involucrel cup cup-shaped, enclosing  $\frac{1}{3}$  or more of fruit ..... 26
26. Fruit apex surrounded by one or more circular grooves ..... 5. *Q. coccinea*
26. Fruit apex not surrounded by a circular groove or grooves ..... 27
27. Leaves pubescent beneath with discrete, axillary tufts of trichomes, often obscuring portions of the veins ..... 19. *Q. nuttallii*
27. Leaves lacking well-defined, axillary tufts of trichomes beneath, pubescence not obscuring portions of the veins ..... 5. *Q. coccinea*
25. Involucrel cup saucer-shaped, enclosing less than  $\frac{1}{3}$  of fruit ..... 28
28. Leaf blades less than 10 cm long ..... 8. *Q. georgiana*
28. Leaf blades, at least some, more than 10 cm long ..... 29
29. Leaves pubescent beneath with discrete, axillary tufts of trichomes, often obscuring portions of the veins ..... 25. *Q. shumardii*
29. Leaves lacking well-defined, axillary tufts of trichomes beneath, pubescence not obscuring portions of the veins ..... 24. *Q. rubra*
19. Leaves lacking marginal bristles, sometimes with mucronate marginal teeth; fruit maturing on growth of present season ..... 30
30. Distal bracts of involucrel cup caudate ..... 31
31. Peduncles more than 2 cm long ..... 3. *Q. bicolor*
31. Peduncles less than 2 cm long ..... 14. *Q. macrocarpa*
30. Distal bracts of involucrel cup obtuse, acute or acuminate ..... 32
32. Involucrel cup enclosing  $\frac{3}{4}$  or more of fruit ..... 13. *Q. lyrata*
32. Involucrel cup enclosing less than  $\frac{3}{4}$  of fruit ..... 33

33. Leaves glabrous beneath, or pubescent only near the principal veins ... 34  
 34. Fruit more than 2 cm long ..... 1. *Q. alba*  
 34. Fruit less than 2 cm long ..... 6. *Q. durandii*  
 33. Leaves pubescent beneath ..... 35  
 35. Upper  $\frac{1}{3}$  of fruit glabrous, lustrous; pubescence on fruit (if any) confined to vicinity of style base ..... 6. *Q. durandii*  
 35. Upper  $\frac{1}{3}$  (or more) of fruit pubescent, dull ..... 36  
 36. Cup enclosing  $\frac{1}{2}$  or less of fruit ..... 26. *Q. stellata*  
 36. Cup enclosing more than  $\frac{1}{2}$  of fruit ..... 4. *Q. chapmanii*

1. *Q. alba* L., WHITE O. Spring; fall. Mesic deciduous woods; throughout.  
 2. *Q. arkansana* Sargent. Spring; fall. Dry, rocky, or sandy slopes, rare; CP.  
 3. *Q. bicolor* Willd., SWAMP WHITE O. Spring; fall. Low woods, very rare; CuP.  
 4. *Q. chapmanii* Sargent. Spring; fall. Sandy woods; OCP.  
 5. *Q. coccinea* Muenchh., SCARLET O., SPANISH O. Spring; fall. Dry woods; throughout, but rare in southern CP.  
 6. *Q. durandii* Buckley.

1. Leaves pubescent over the lower surfaces ..... *Q. durandii* var. *durandii*  
 1. Leaves glabrous over the lower surfaces ..... *Q. durandii* var. *austrina*

*Q. durandii* Buckley var. *durandii*, PIN O. Spring; fall. Deciduous upland woods, thickets, usually on circumneutral soil; CP, CuP. *Q. brevilobata* (Torr.) Sarg.—M.

*Q. durandii* var. *austrina* (Small) Palmer. Spring; fall. River bluffs, alluvial woods; CP, CuP. *Q. austrina* Sm.—S, RAB.

7. *Q. falcata* Michaux. Spring; fall.

1. Leaves rusty-tomentose beneath; old bark quickly cracking and becoming roughened ..... *Q. falcata* var. *falcata*  
 1. Leaves white-tomentose beneath; old bark cracking tardily, not conspicuously roughened ..... *Q. falcata* var. *pagodaefolia*

*Q. falcata* Michaux var. *falcata*, SOUTHERN RED O. Upland and low woods; throughout. *Q. digitata* (Marsh.) Sudw.—M; *Q. rubra* L.—S.

*Q. falcata* var. *pagodaefolia* Elliott, CHERRY-BARK O. Rich woods, often alluvial, more common in circumneutral habitats; CP, P, VR, CuP, HR. *Q. pagoda* Raf.—H, S; *Q. pagodaefolia* (Ell.) Ashe—M.

8. *Q. georgiana* Curtis, GEORGIA O. Spring; fall. Dry woods, very rare; southern CuP.

9. *Q. imbricaria* Michaux, SHINGLE O. Spring; fall. Mesic woods, very rare; OCP, VR.

10. *Q. incana* Bartram, BLUEJACK O., UPLAND WILLOW O. Spring; fall. Dry woods, thickets; CP, VR, CuP. *Q. brevifolia* (Lam.) Sarg.—M; *Q. cinerea* Michx.—H, S.

11. *Q. laevis* Walter, TURKEY O., FORKED-LEAF BLACKJACK O. Spring; fall. Upland woods; CP. *Q. catesbaei* Michx.—M, H.

12. *Q. laurifolia* Michaux, LAUREL O. Spring; fall. Mesic woods; CP, P (rare), CuP. *Q. obtusa* (Willd.) Ashe—H, S.—The conjunctive status of this species and of *Q. nigra* L. and *Q. phellos* L. is worthy of further study.

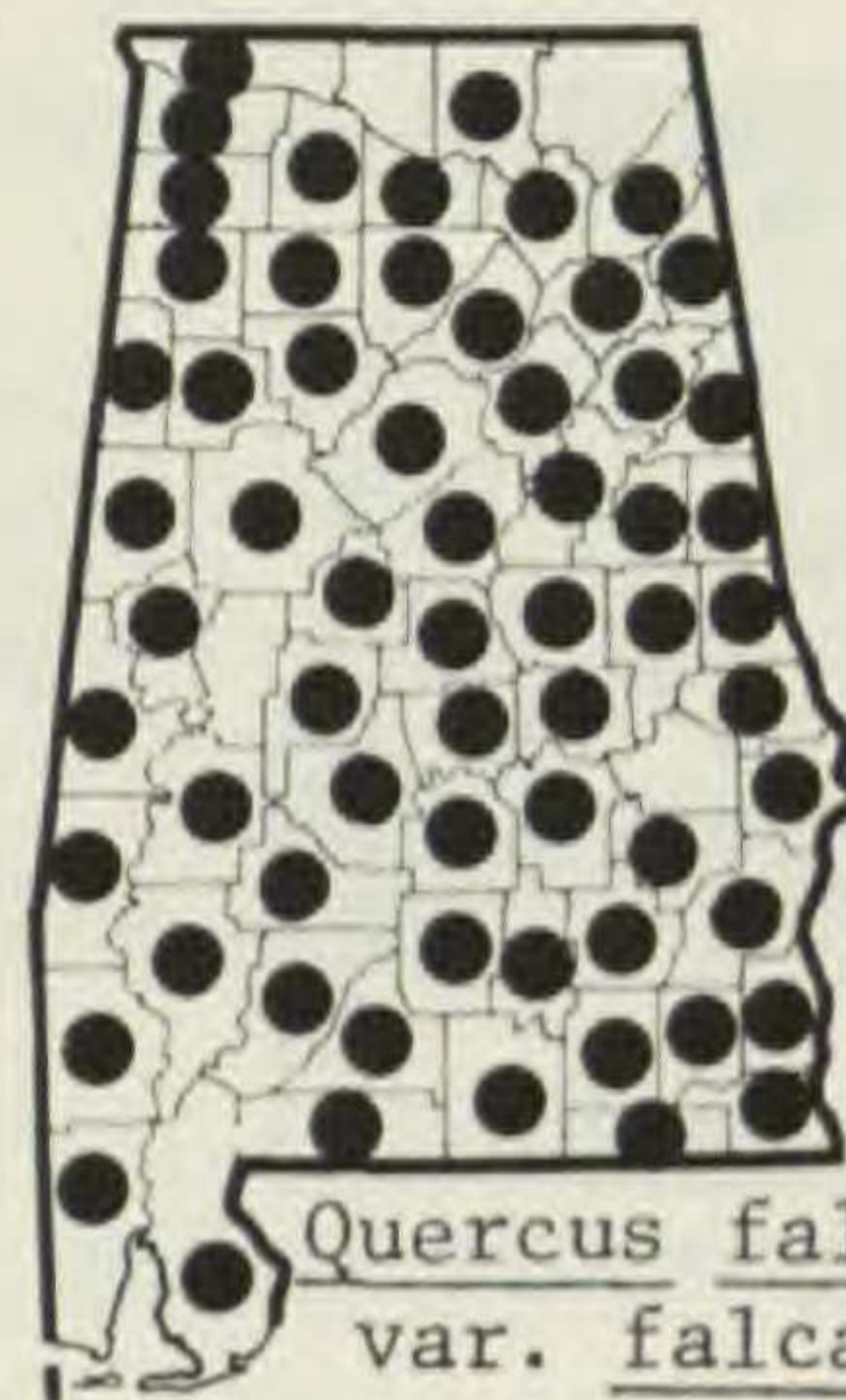




Quercus durandii  
var. durandii



Quercus durandii  
var. austrina



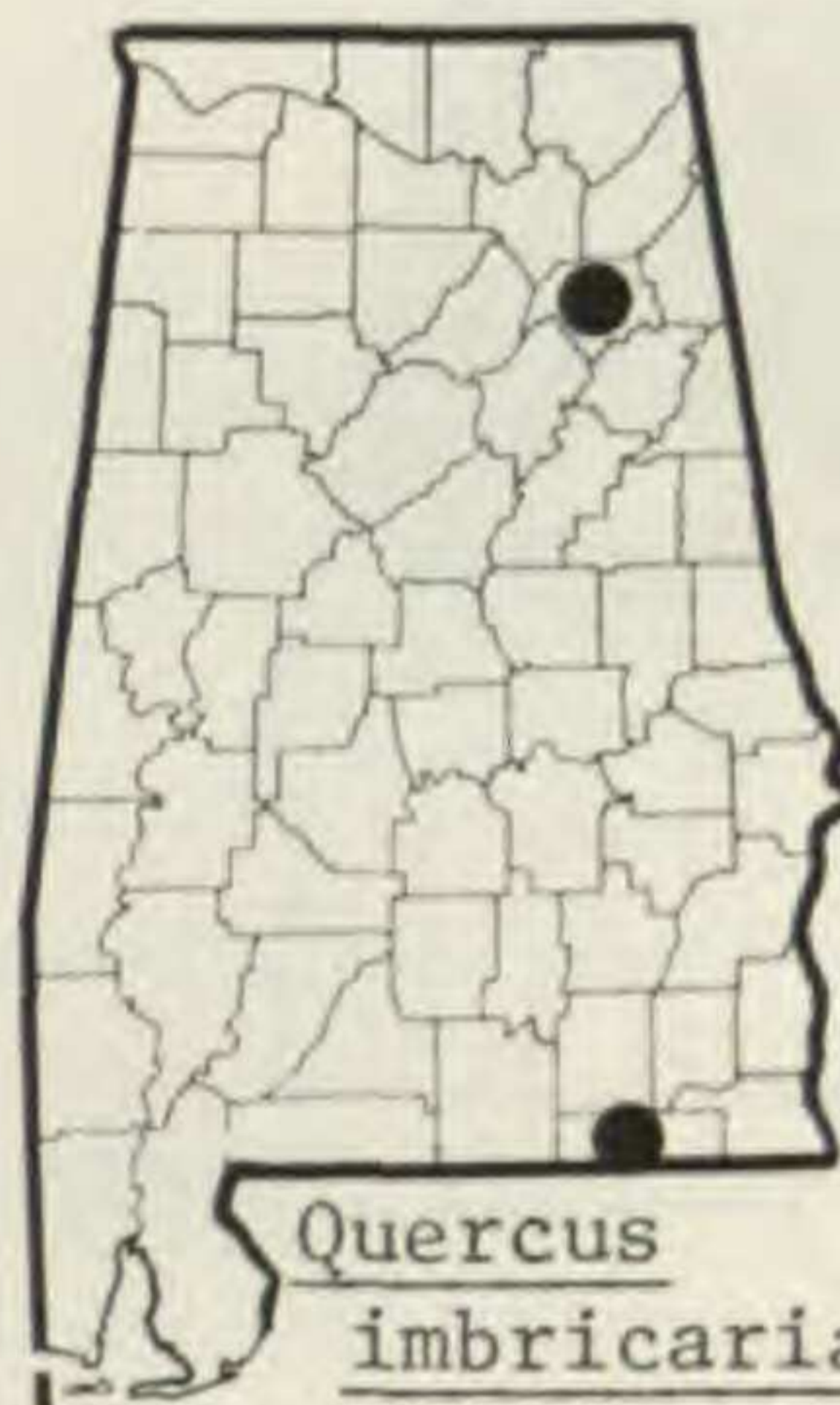
Quercus falcata  
var. falcata



Quercus falcata  
var. pagodaefolia



Quercus georgiana



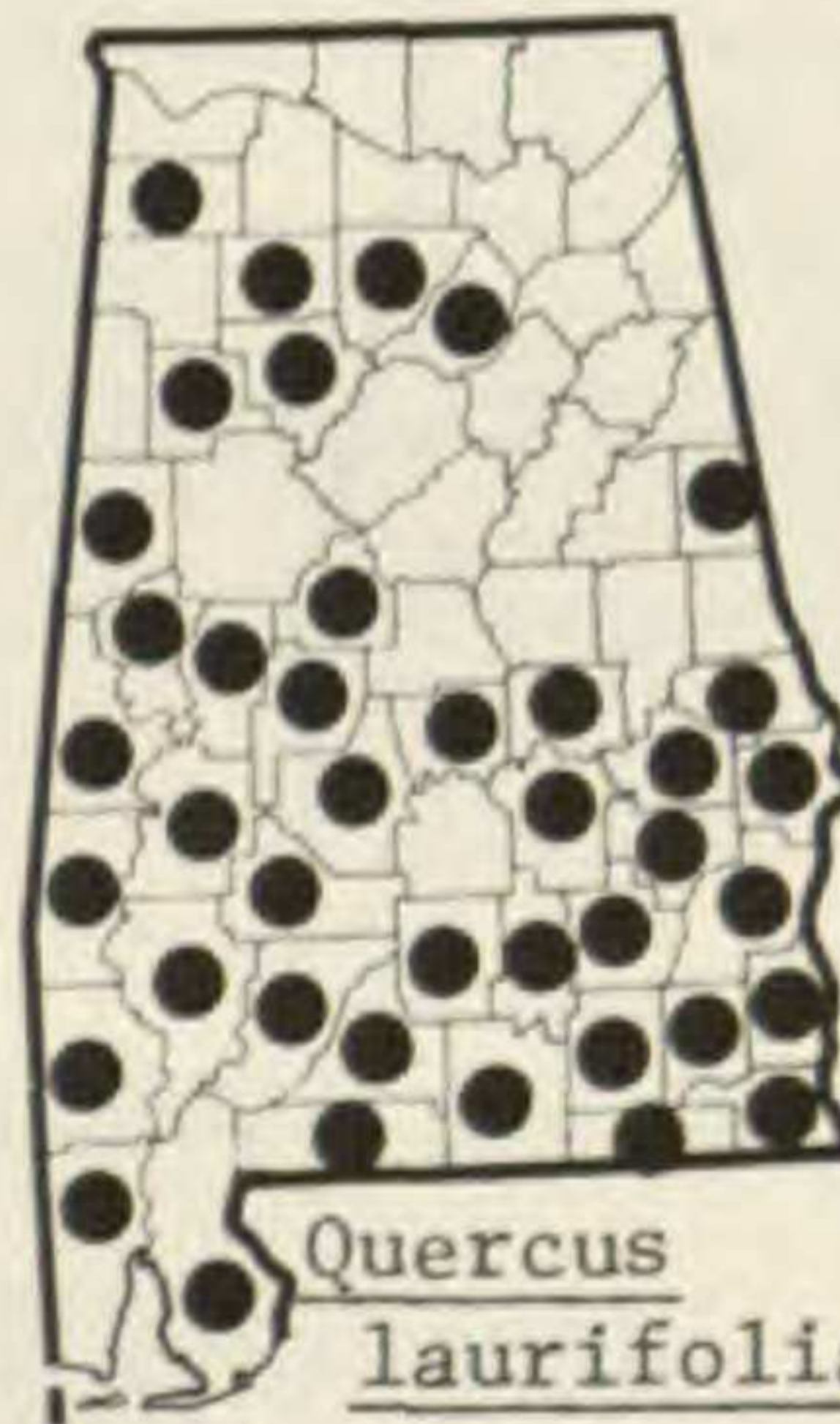
Quercus  
imbricaria



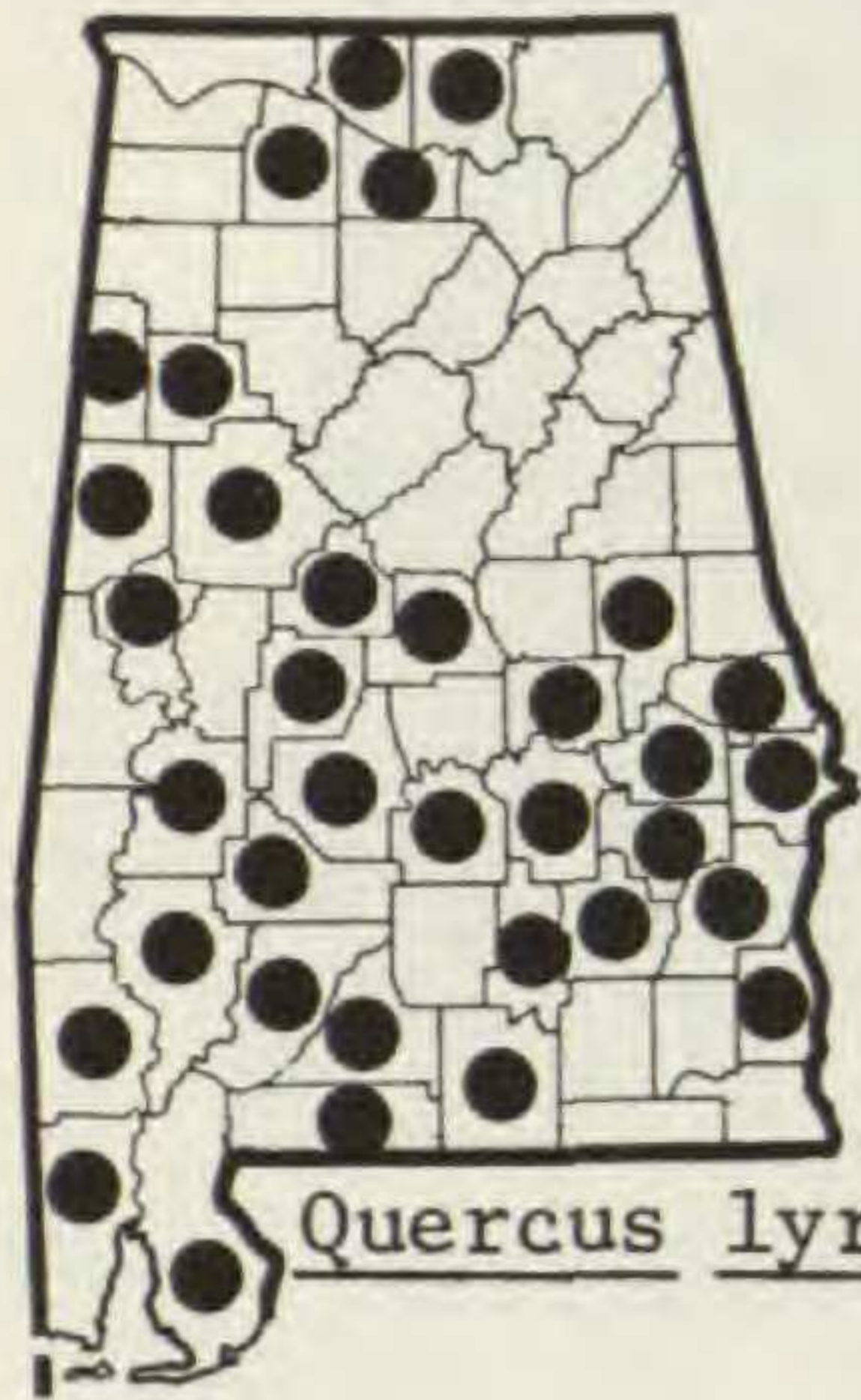
Quercus incana



Quercus laevis



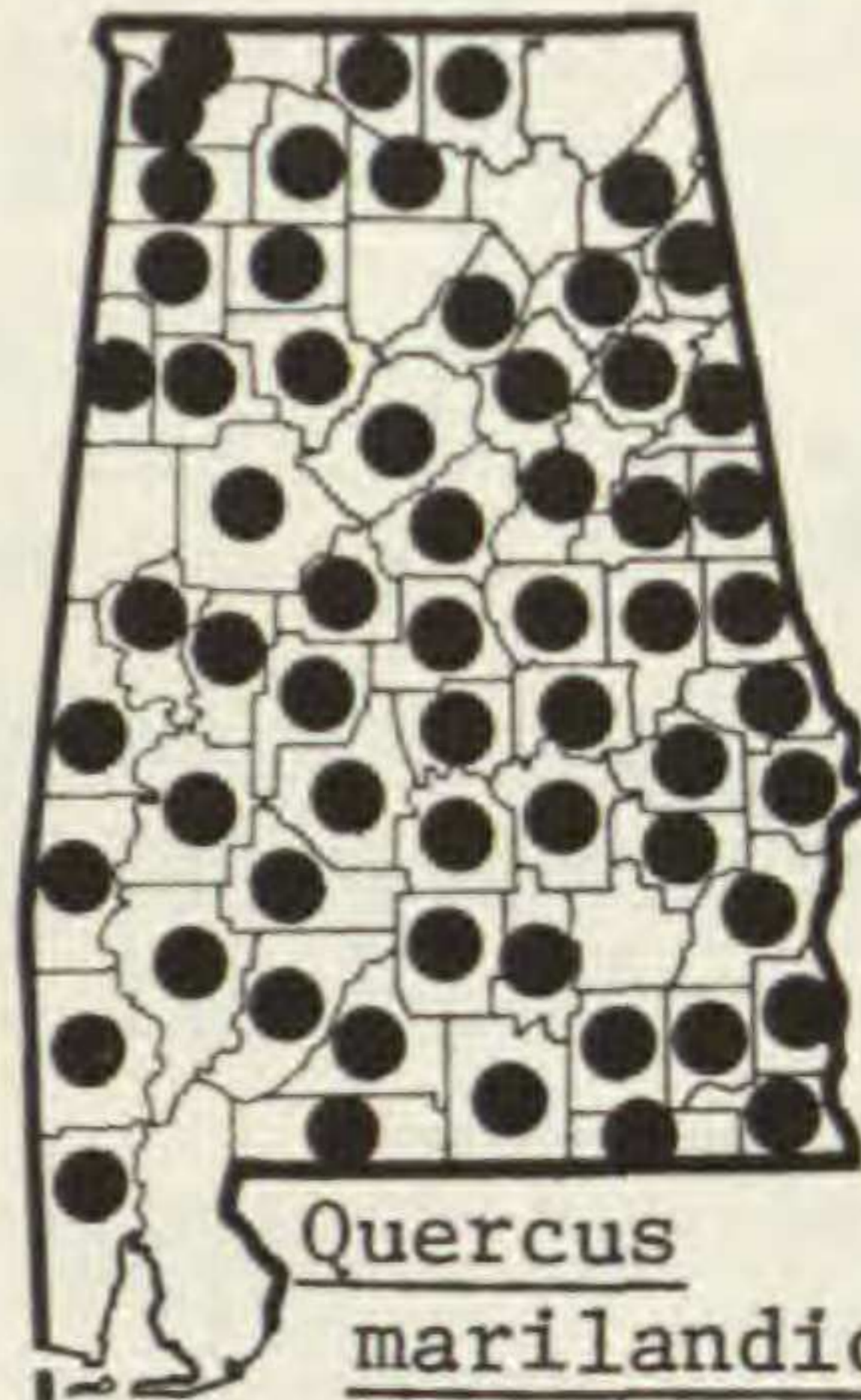
Quercus  
laurifolia



Quercus lyrata



Quercus macrocarpa



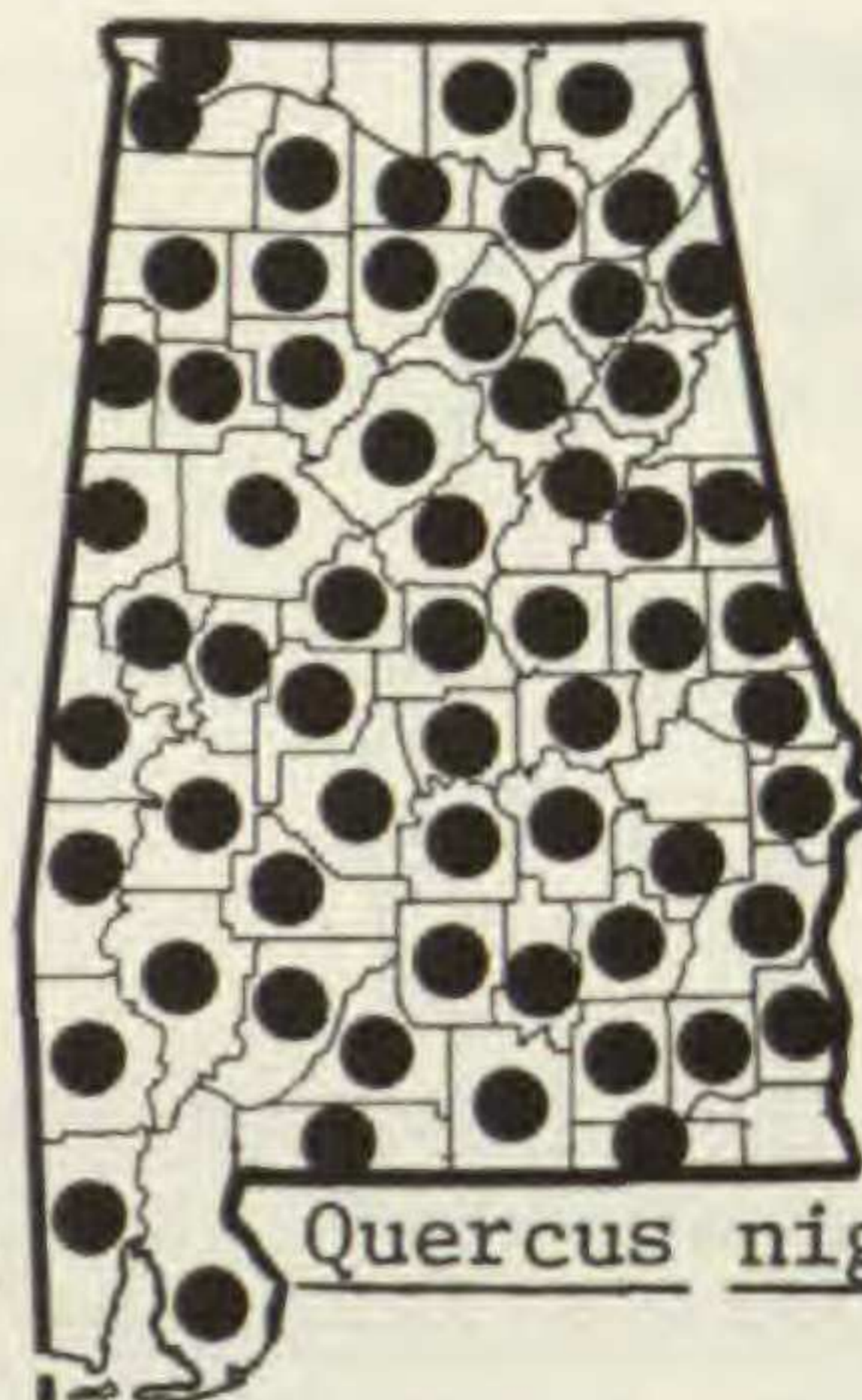
Quercus marilandica



Quercus montana



Quercus myrtifolia



Quercus nigra



Quercus nuttallii



Quercus phellos



Quercus prinoides  
var. prinoides

13. *Q. lyrata* Walter, OVERCUP O. Spring; fall. Alluvial woods and swamps; CP, HR.

14. *Q. macrocarpa* Michaux, BUR O. Spring; fall. Pasture, very rare; Black Belt of CP.

15. *Q. marilandica* Muenchh., BLACKJACK O. Spring; fall. Upland woods; throughout.—*Q. marylandica* is a spelling employed by some authors.

16. *Q. montana* Willd., CHESTNUT O. Spring; fall. Upland woods; throughout, except for southern CP. *Q. prinus* L.—RAB.

17. *Q. myrtifolia* Willd., MYRTLE O. Late winter—early spring; fall. Dunes, sandy woods and thickets; OCP.

18. *Q. nigra* L., WATER O. Spring; fall. Mesic and low woods; throughout. See comment under *Q. laurifolia*.

19. *Q. nuttallii* Palmer. Spring; fall. River swamps, alluvial woods, infrequent; CP, southern CuP. *Q. texana* Buckl.—M, in part.—This species appears to be confined to the western half of Alabama. Occasionally planted.

20. *Q. phellos* L., WILLOW O. Spring; fall. Alluvial and mesic woods; throughout. See comment under *Q. laurifolia*.

21. *Q. prinoides* Willd. Spring; fall.

1. Plant shrubby, soboliferous ..... *Q. prinoides* var. *prinoides*  
 1. Plant arborescent ..... *Q. prinoides* var. *acuminata*

*Q. prinoides* Willd. var. *prinoides*, DWARF CHINKAPIN O. Upland thickets, very rare; P, CuP.

*Q. prinoides* var. *acuminata* (Michaux) Gleason, CHINKAPIN O. Mesic or dry woods, usually over calcareous substrata; throughout, except rare or absent in southern CP. Much more common than the typical variety. *Q. acuminata* (Michx.) Sarg.—M; *Q. muehlenbergii* Engelm.—H, S, RAB.

22. *Q. prinus* L., SWAMP CHESTNUT O., BASKET O. Spring; fall. River swamps, alluvial woods; CP, VR (rare), CuP (rare), HR. *Q. michauxii* Nutt.—M, H, RAB.

23. *Q. pumila* Walter. Spring; fall. Thickets, low pinelands; OCP.

24. *Q. rubra* L., RED O., NORTHERN RED O. Spring; fall. Mesic woods; throughout, but infrequent southward. *Q. borealis maxima* (Marsh.) Sarg. or Ashe<sup>3</sup>—H; *Q. maxima* (Marsh.) Ashe, *Q. borealis* Michx. f.—S; *Q. rubra* var. *borealis* (Michx. f.) Farw.—RAB.

25. *Q. shumardii* Buckley, SHUMARD'S O. Spring; fall. Mesic and alluvial woods; throughout, except rare in southern CP. *Q. texana* Buckl.—M, in part; *Q. schneckii* Britt.—H, S.

26. *Quercus stellata* Wang. Spring; fall.

1. Twigs tomentose; petioles usually more than 1 cm long ..... *Q. stellata* var. *stellata*  
 1. Twigs glabrous; petioles usually less than 1 cm long ..... *Q. stellata* var. *margaretta*

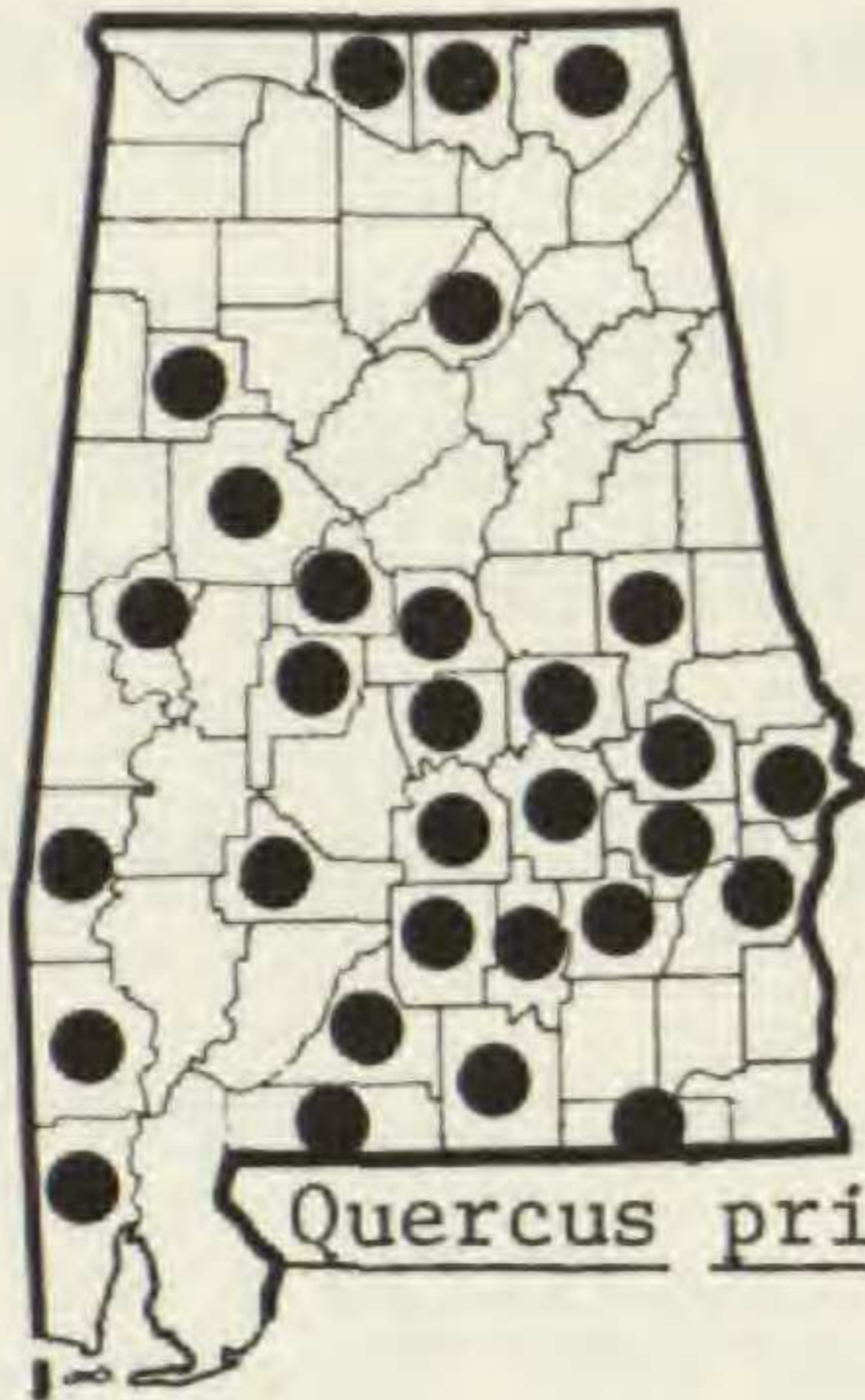
*Q. stellata* var. *stellata*, POST O. Upland and mesic woods; throughout. *Q. minor* (Marsh.) Sarg.—M.

*Q. stellata* var. *margaretta* (Ashe) Sargent, DWARF POST O. Upland woods, dry thickets; CP, southern CuP, VR. *Q. margaretta* Ashe—S, RAB.—Although

<sup>3</sup> See citation and footnote of Harper (1928:124.).



Quercus prinoides  
var. acuminata



Quercus prinus



Quercus pumila



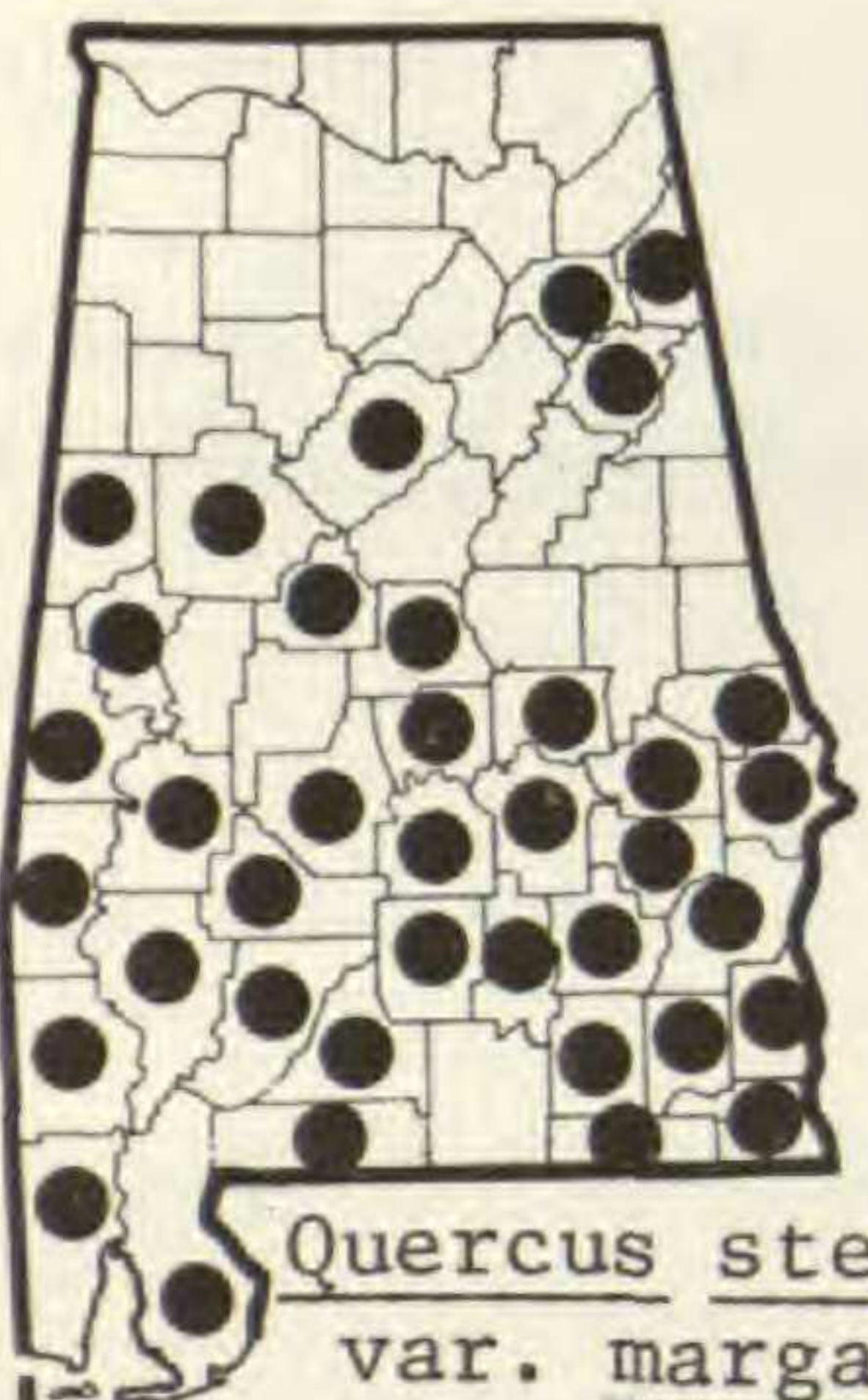
Quercus rubra



Quercus shumardii



Quercus stellata  
var. stellata



Quercus stellata  
var. margaretta



Quercus velutina



Quercus  
virginiana

this variety is usually of smaller size than the typical variety, the writer has seen trees more than 2 feet in diameter (DBH) in southern Alabama. This variety appears more distinct than it actually is because of a consistently smaller average leaf size than the typical variety displays. This rather subjective difference is the usual method of differentiating the two taxa. Populations of *Q. stellata* var. *margaretta* in the Valley and Ridge Province have been called *Q. boyntonii* Bead., but they differ in no consistent or significant way from the main series of populations in the Coastal Plain. Other "coastal plain oaks" (*Q. incana* Bartr., *Q. prinus* L., etc.) also occur in the Valley and Ridge Province, and also appear little-diverged from their main genetic stocks.

27. *Q. velutina* Lam., BLACK O. Spring; fall. Dry and mesic woods; throughout, but rare in southern CP.

28. *Q. virginiana* Miller, LIVE O. Spring; fall. Sandy woods; OCP. Occasionally planted and rarely escaped further inland. *Q. virginiana maritima* (Michx.) Sarg.—M; *Q. geminata* Sm.—H, S; *Q. minima* Sm.—H, S.

## 12. ULMACEAE

- |  |                   |
|--|-------------------|
| 1. Fruit drupaceous; leaves with 3 principal veins .....                 | 1. <i>Celtis</i>  |
| 1. Fruit samaroid or bur-like; leaves with a single principal vein ..... | 2                 |
| 2. Fruit a bur-like nut or nutlet .....                                  | 2. <i>Planera</i> |
| 2. Fruit a samara .....  | 3. <i>Ulmus</i>   |

### 1. *Celtis* L., HACKBERRY, SUGARBERRY

- |   |                                   |
|---|-----------------------------------|
| 1. Leaves of fertile branches lanceolate, 2 times or more as long as wide, uniformly green on both surfaces, serrate to entire .....  | 1. <i>C. laevigata</i>            |
| 1. Leaves of fertile branches ovate to ovate-lanceolate, usually less than 2 times as long as wide, clearly darker in color above than beneath, serrate-dentate to entire ..... | 2. <i>C. occidentalis</i> complex |

1. *C. laevigata* Willd. Spring; summer-fall. Low, alluvial, or mesic woods; throughout. *C. mississippiensis* Bosc—M, S; *C. smallii* Bead.—S.

2. *C. occidentalis* L., complex. Spring; summer-fall. Deciduous woods, thickets, throughout. *C. occidentalis pumila* (Pursh) Gray—M; *C. pumila* Pursh—H; *C. georgiana* Sm.—S; *C. occidentalis* var. *georgiana* (Sm.) Ahles—RAB.

### 2. *Planera* Gmelin, WATER ELM

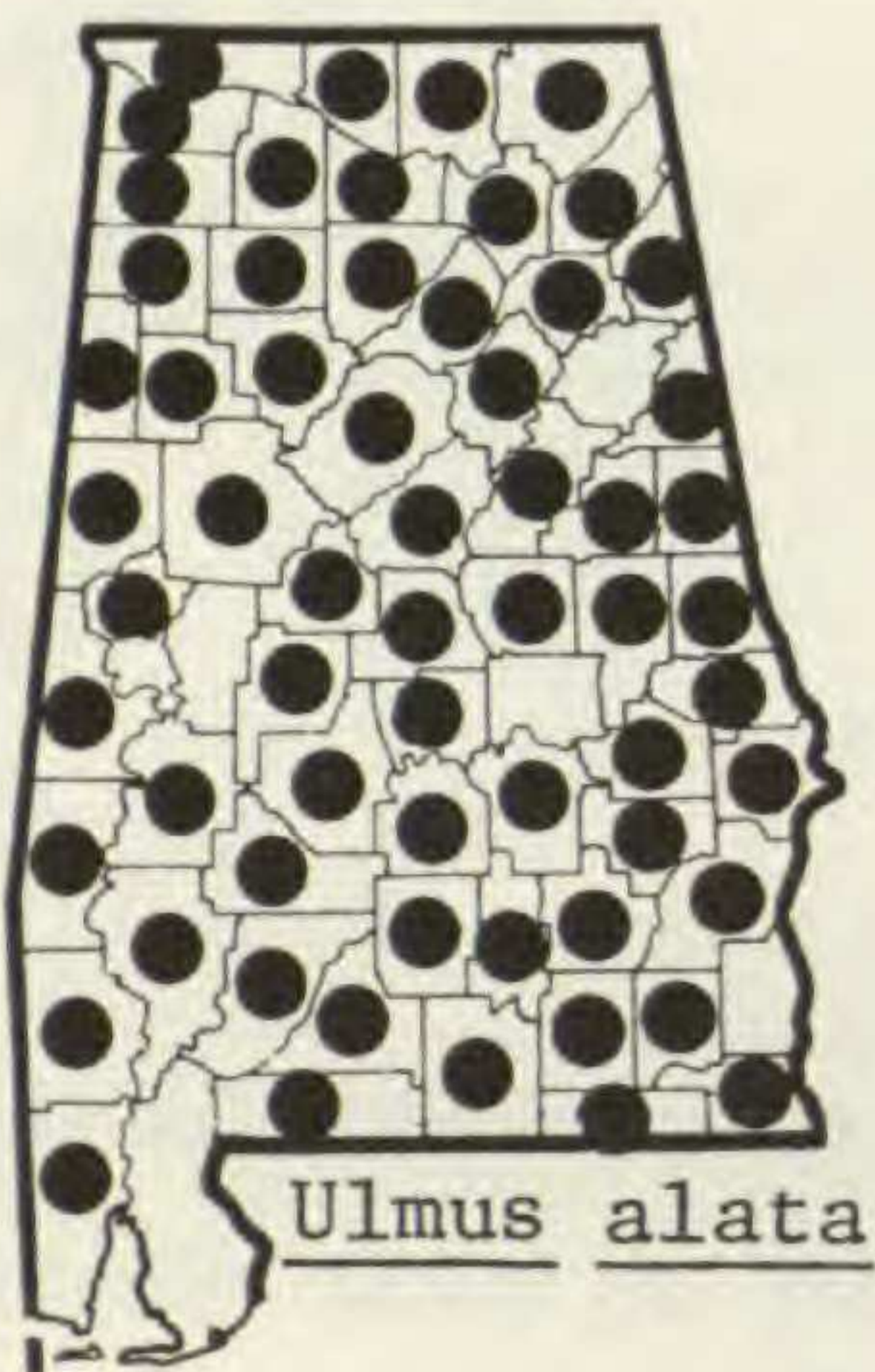
1. *P. aquatica* Gmelin. Spring. Riverbanks, swamps, infrequent; principally CP.

### 3. *Ulmus* L., ELM

- |  |                        |
|--|------------------------|
| 1. Flowers and fruits vernal .....                                       | 2                      |
| 2. Inflorescence racemose; samara prominently ciliate .....              | 3                      |
| 3. Faces of ovary and fruit pubescent .....                              | 1. <i>U. alata</i>     |
| 3. Faces of ovary and fruit glabrous .....                               | 2. <i>U. americana</i> |
| 2. Inflorescence fasciculate; samara eciliate, or remotely ciliate ..... | 3. <i>U. rubra</i>     |
| 1. Flowers and fruits autumnal .....                                     | 4. <i>U. serotina</i>  |

1. *U. alata* Michaux, WINGED E., PISS E. Late winter-spring; spring. Upland or low woods; throughout.

12. ULMACEAE



13. MORACEAE



2. *U. americana* L., WHITE E., AMERICAN E. Late winter-spring; spring. Alluvial, low or mesic woods; throughout.

3. *U. rubra* Muhl., SLIPPERY E., RED E. Late winter-spring; spring. Rich woods, usually over calcareous substrata; throughout. *U. fulva* Michx.—M, H, S.

4. *U. serotina* Sargent. Fall. Rich woods, rare; VR, CuP, HR.

### 13. MORACEAE

- |   |                        |
|---|------------------------|
| 1. Leaves entire; stipular thorns often present ..... | 2. <i>Maclura</i>      |
| 1. Leaves dentate; stipular thorns absent .....       | 2                      |
| 2. Twigs and petioles densely hirsute .....           | 1. <i>Broussonetia</i> |
| 2. Twigs and petioles glabrous or cinereous .....     | 3. <i>Morus</i>        |

#### 1. *Broussonetia* L'Her, PAPER MULBERRY

1. *B. papyrifera* (L.) Vent. Spring; fruit not seen. Woodlots, fencerows, waste places; throughout. *Papyrius papyrifera* (L.) Kuntze—H, S.

#### 2. *Maclura* Nuttall

1. *M. pomifera* (Rafinesque) Schneider, OSAGE ORANGE, MOCK ORANGE, BOIS D'ARC (commonly pronounced "bo-darc"). Spring; summer-fall. Upland woods, infrequent except in Black Belt; throughout. *Toxylon pomiferum* Raf.—M, H, S.

#### 3. *Morus* L., MULBERRY

- |  |                    |
|--|--------------------|
| 1. Leaves glabrous beneath, or pubescent only on the principal veins ..... | 1. <i>M. alba</i>  |
| 1. Leaves pubescent beneath throughout .....                               | 2. <i>M. rubra</i> |

1. *M. alba* L., WHITE M. Spring; late spring-early summer. Infrequent escape; throughout.

2. *M. rubra* L., RED M., (common) M. Spring; late spring-early summer. Alluvial and mesic woods, fencerows; throughout.

*Ficus carica* L., FIG, is rarely persistent but not established as a member of the flora.

### 14. SANTALACEAE

- |  |                     |
|--|---------------------|
| 1. Leaves opposite or subopposite, entire .....        | 1. <i>Nestronia</i> |
| 1. Leaves alternate, usually irregularly serrate ..... | 2. <i>Pyrularia</i> |

#### 1. *Nestronia* Raf.

1. *N. umbellula* Rafinesque. Spring; summer. Sandy woods-margins, rare; CP, P, CuP. *N. umbellulata* Raf.—M, H.

#### 2. *Pyrularia* Michaux

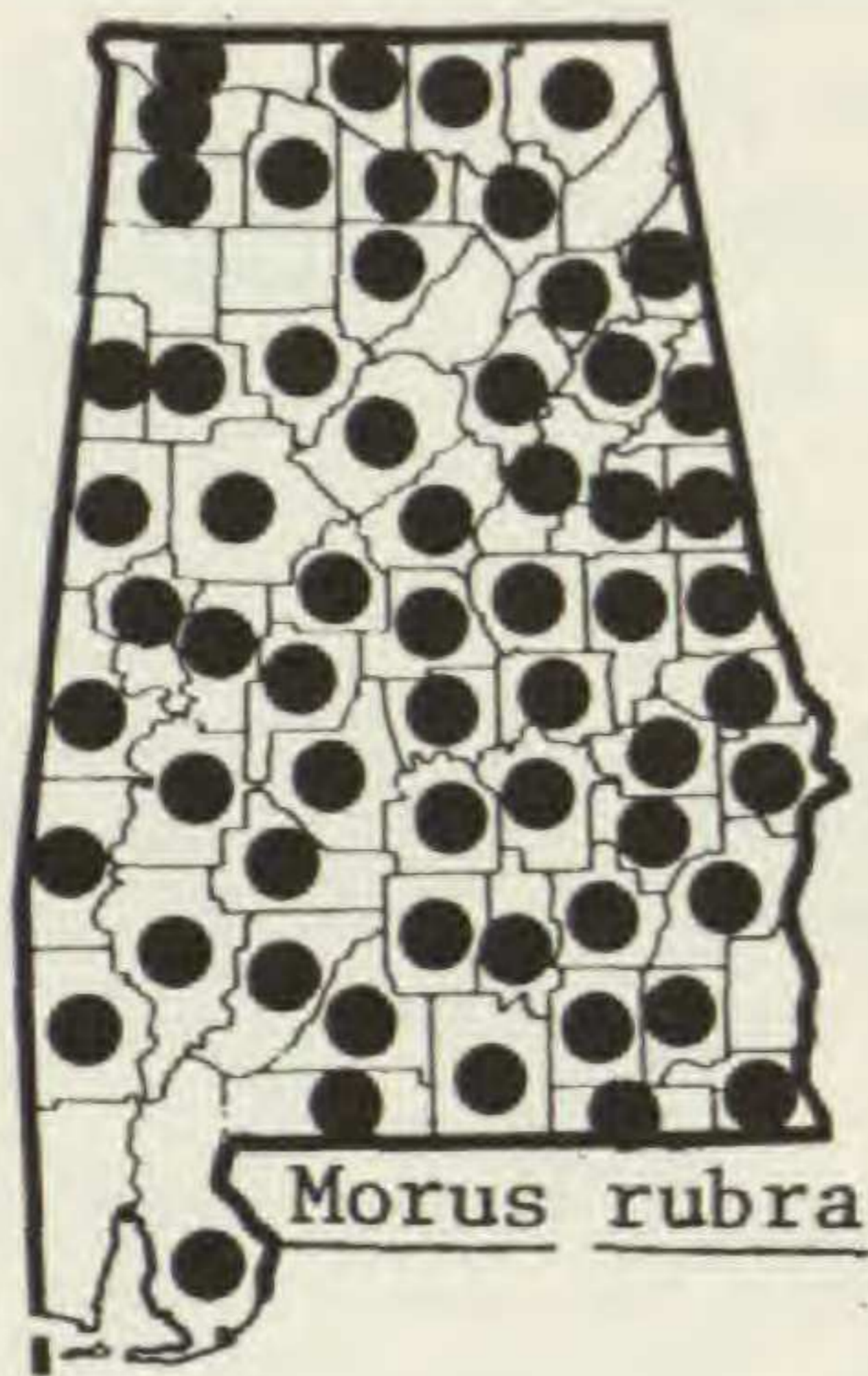
1. *P. pubera* Michaux. Spring; fall. Alluvial woods, rare; AM, CuP.

### 15. LORANTHACEAE

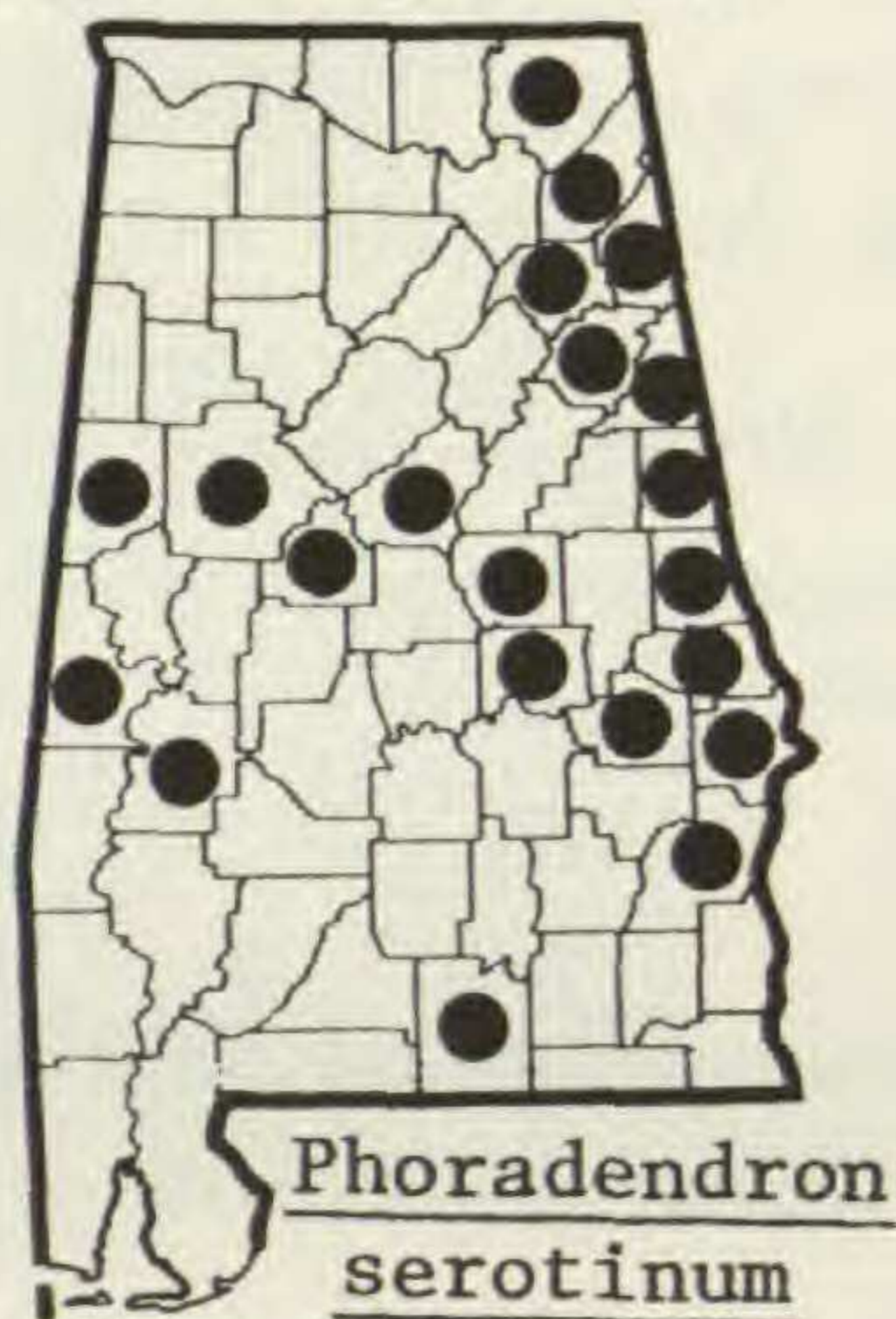
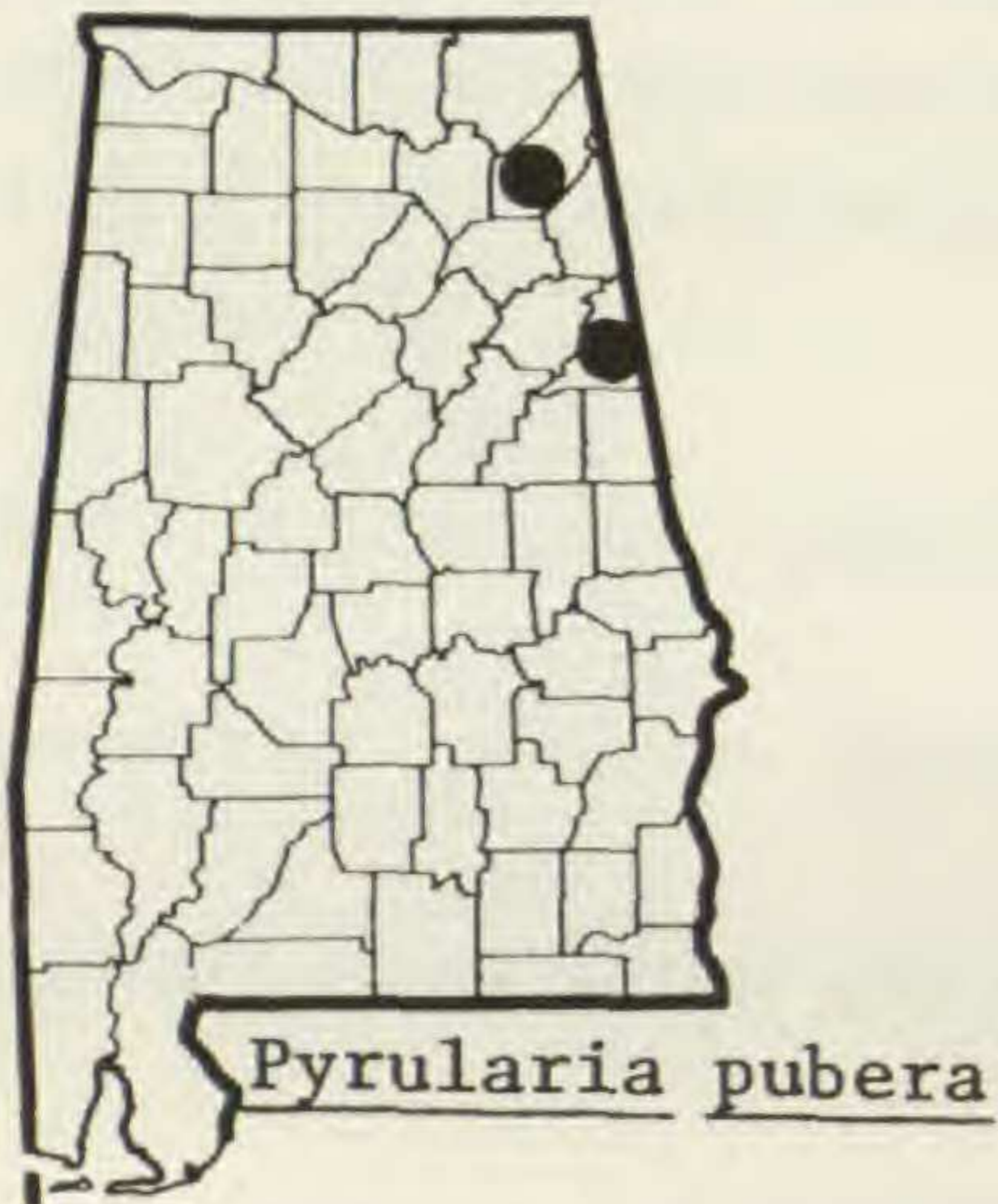
#### 1. *Phoradendron* Nuttall, MISTLETOE

1. *P. serotinum* (Rafinesque) Johnston. Late winter-early spring; winter. On

14. SANTALACEAE



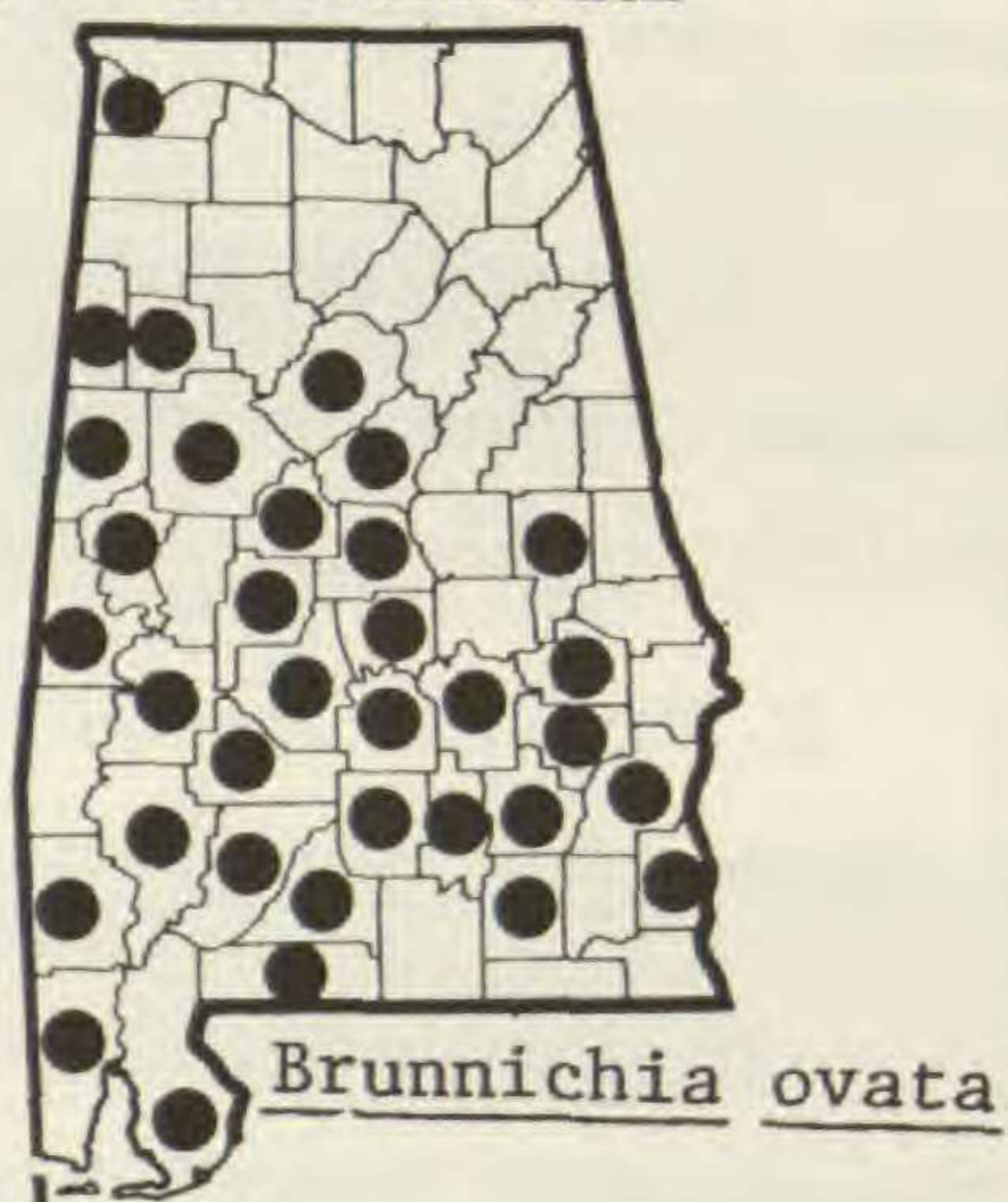
15. LORANTHACEAE



16. ARISTOLOCHIACEAE



17. POLYGONACEAE





deciduous trees; throughout, but poorly collected. *P. flavescens* (Pursh) Nutt.—M, H, S.

## 16. ARISTOLOCHIACEAE

1. *Aristolochia* L.

1. *A. tomentosa* Sims. Spring; fall. Alluvial and rich woods, infrequent; throughout.

*Aristolochia durior* Hill (= *A. macrophylla* Lam.) has been reported.

## 17. POLYGONACEAE

1. Plant a high-climbing vine ..... 1. *Brunnichia*  
1. Plant low-growing, shrubby or suffruticose ..... 2. *Polygonella*

1. *Brunnichia* Banks ex Gaertn., LADIES' EAR-DROPS

1. *B. ovata* (Walter) Shinnars. Late spring–summer; summer–fall. Alluvial woods, river swamps; principally CP. *B. cirrhosa* Banks—M, H, RAB.

2. *Polygonella* Michaux

1. Flowers perfect; calyx more than 2 mm long in flower, more than 3 mm long in fruit ..... 1. *P. americana*  
1. Flowers imperfect; calyx less than 2 mm long in flower, less than 3 mm long in fruit ..... 2. *P. polygama*

1. *P. americana* (Fisch. & Mey.) Small. Sandy soil, rare; CuP.

2. *P. polygama* (Vent.) Engelman & Gray. Dunes; OCP.

## BATACEAE

Alabama is within the range cited by Small (1933) for *Batis maritima* L. No specimens have been seen by the writer.

## 18. RANUNCULACEAE

1. Leaves opposite, 3-foliolate ..... 1. *Clematis*  
1. Leaves alternate, commonly 5- or more-foliolate ..... 2. *Xanthorhiza*

1. *Clematis* L.

1. *C. virginiana* L., VIRGIN'S BOWER. Summer; fall. Low thickets, mesic woods; throughout. *C. catesbyana* Pursh—M, S.

2. *Xanthorhiza* Marshall, YELLOW-ROOT

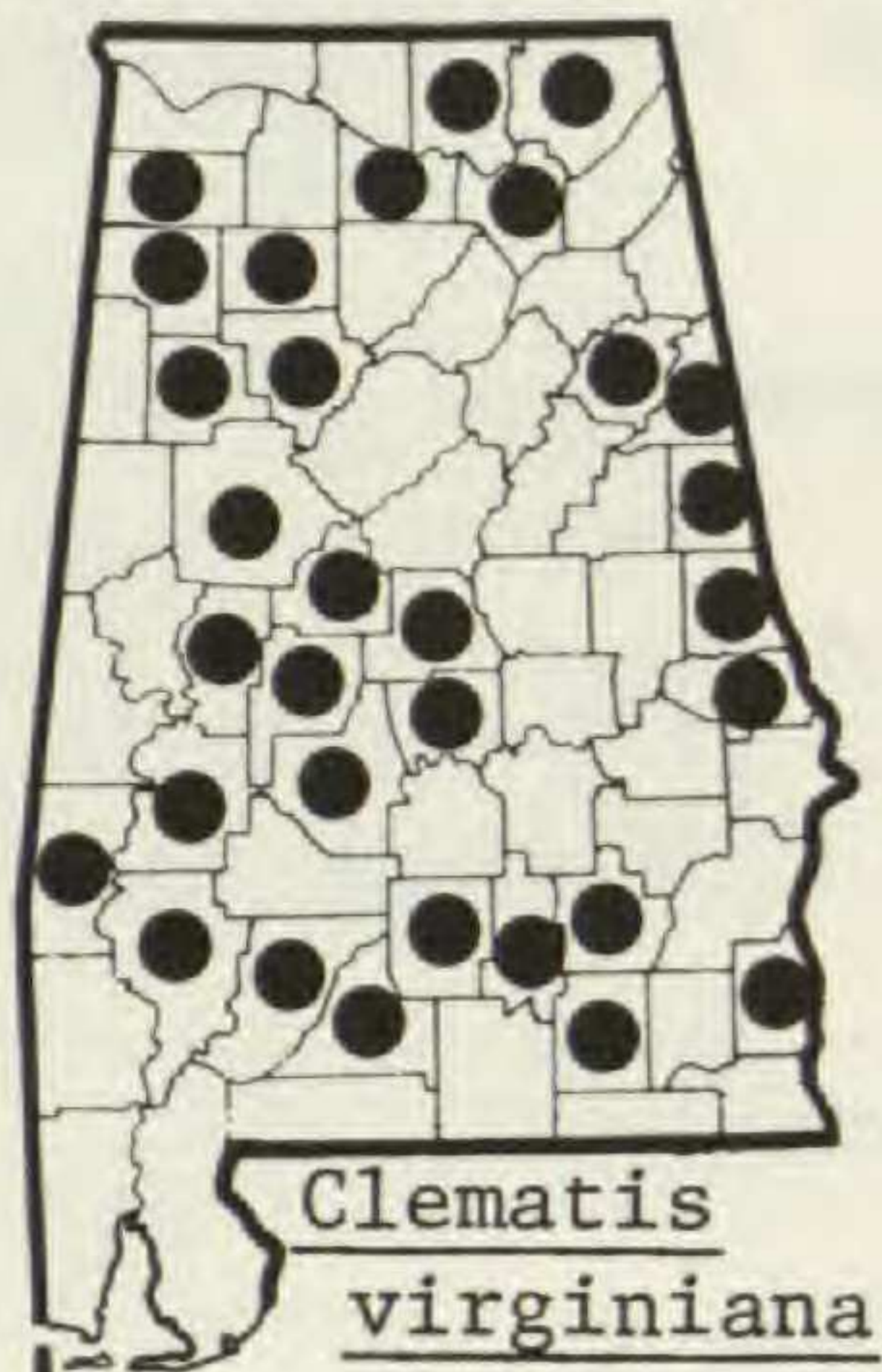
1. *X. simplicissima* Marshall. Spring; spring–early summer. Stream-banks, alluvial woods; CP, P, AM, CuP, VR. Rare southward in CP. *Zanthorhiza apiifolia* L'Her—M.

## 19. MENISPERMACEAE

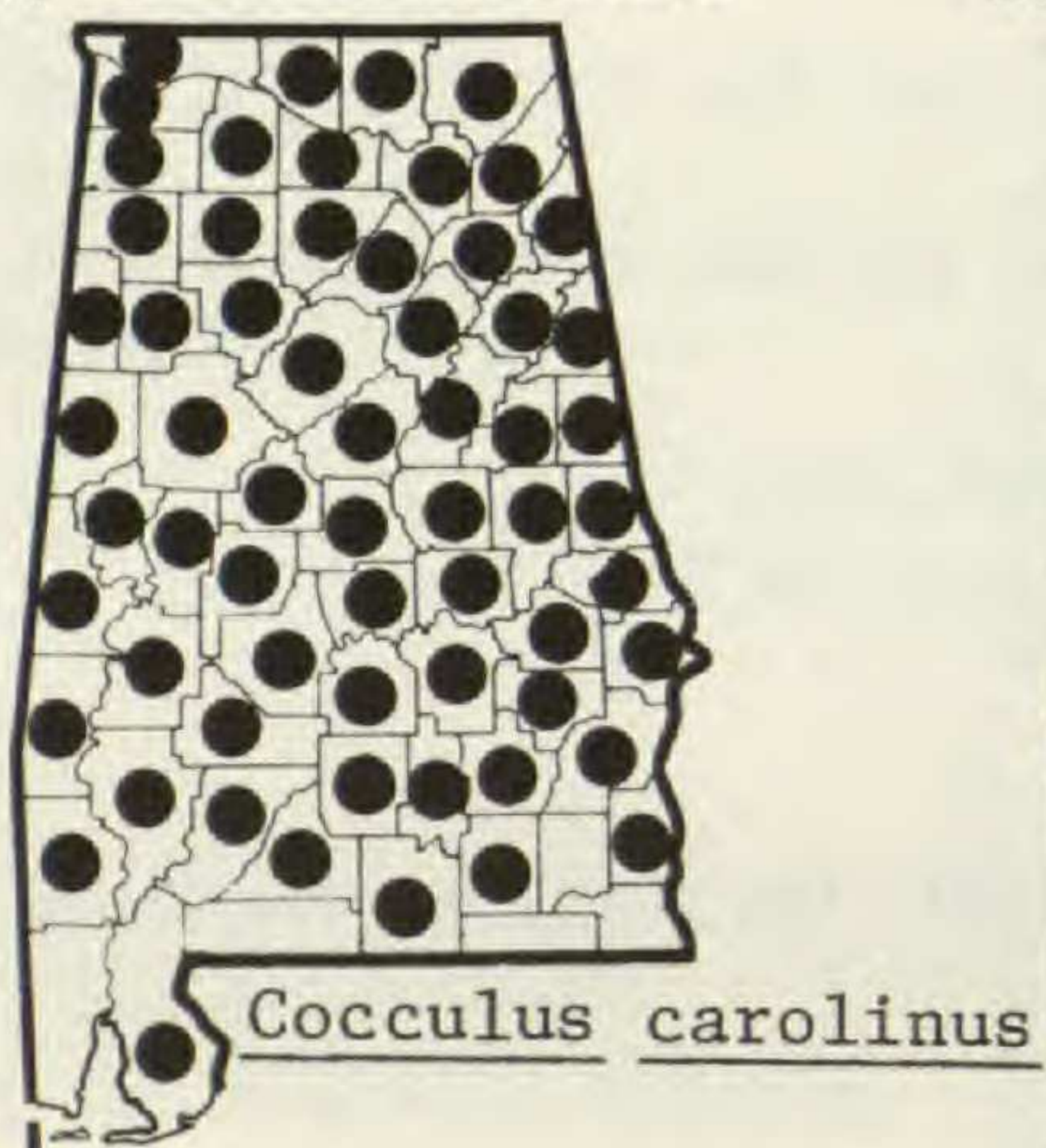
1. *Cocculus* DC.

1. *C. carolinus* (L.) DC. Summer; summer–fall. Thickets, fields, fencerows, rights-of-way; throughout. *Cebatha carolina* (L.) Britt.—M; *Epibaterium carolinum* (L.) Britt.—S.

18. RANUNCULACEAE



19. MENISPERMACEAE



20. MAGNOLIACEAE



## 20. MAGNOLIACEAE

1. Leaves broadly emarginate, lobed; exauriculate; fruit samaroid ..... 1. *Liriodendron*  
 1. Leaves obtuse to acuminate, unlobed, often auriculate; fruit follicular ..... 2. *Magnolia*

1. *Liriodendron* L., YELLOW POLAR, TULIP TREE

1. *L. tulipifera* L. Spring; fall. Mesic woods, low woods; throughout.

2. *Magnolia* L.

1. Leaf bases auriculate ..... 2  
 2. Leaves glaucous beneath ..... 4. *M. macrophylla*  
 2. Leaves not glaucous beneath ..... 2. *M. fraseri*  
 1. Leaf bases not auriculate ..... 3  
 3. Leaves glaucous beneath ..... 6. *M. virginiana*  
 3. Leaves not glaucous beneath ..... 4  
 4. Leaves evergreen, coriaceous ..... 3. *M. grandiflora*  
 4. Leaves not evergreen, not coriaceous ..... 5  
 5. Leaves clustered terminally on twig; follicles beaked ..... 5. *M. tripetala*  
 5. Leaves not clustered terminally on twig; follicles rounded ..... 1. *M. acuminata*

1. *M. acuminata* L., CUCUMBER TREE. Spring; summer. Rich woods, often in circumneutral soils; CP, P, CuP, HR. *M. acuminata cordata* (Michx.) Sarg.—M; *M. cordata* Michx.—H; *Tulipastrum acuminatum* (L.) Sm., *T. cordatum* Sm.—S.—*Magnolia cordata* Michaux is a yellow-flowered form. The common name of this species and others below is often pronounced "cowcumber."

2. *M. fraseri* Walter. Spring; summer. Rich woods; CP. *M. pyramidata* Pursh—H, S; *M. pyramidata* Bartr. ex Pursh—RAB.—*Magnolia pyramidata* Bartr. has been applied to the coastal plain plants of this taxon, which are usually smaller than mature plants from further inland. There is no apparent reason to consider these as distinct entities, even though there is a range discontinuity.

3. *M. grandiflora* L., MAGNOLIA. Spring—early summer; fall. Low or rich woods; CP, occasionally escaped northward. *M. foetida* (L.) Sarg.—M.

4. *M. macrophylla* Michaux, BIGLEAF CUCUMBER TREE. Spring; fall. Low or upland rich woods; CP, AM, CuP.—Mohr (1901) speaks of trees "16 to 30 inches in diameter."

5. *M. tripetala* L., UMBRELLA TREE, CUCUMBER TREE. Spring; summer—fall. Rich woods; CP, P, AM, VR, CuP.

6. *M. virginiana* L., BAY. Spring—summer; summer—fall. Ditches, swamps, seepages, bogs, swamp ecotones; CP, P, AM, VR. *M. glauca* L.—H.

## 21. ILLICIACEAE

1. *Illicium* L.

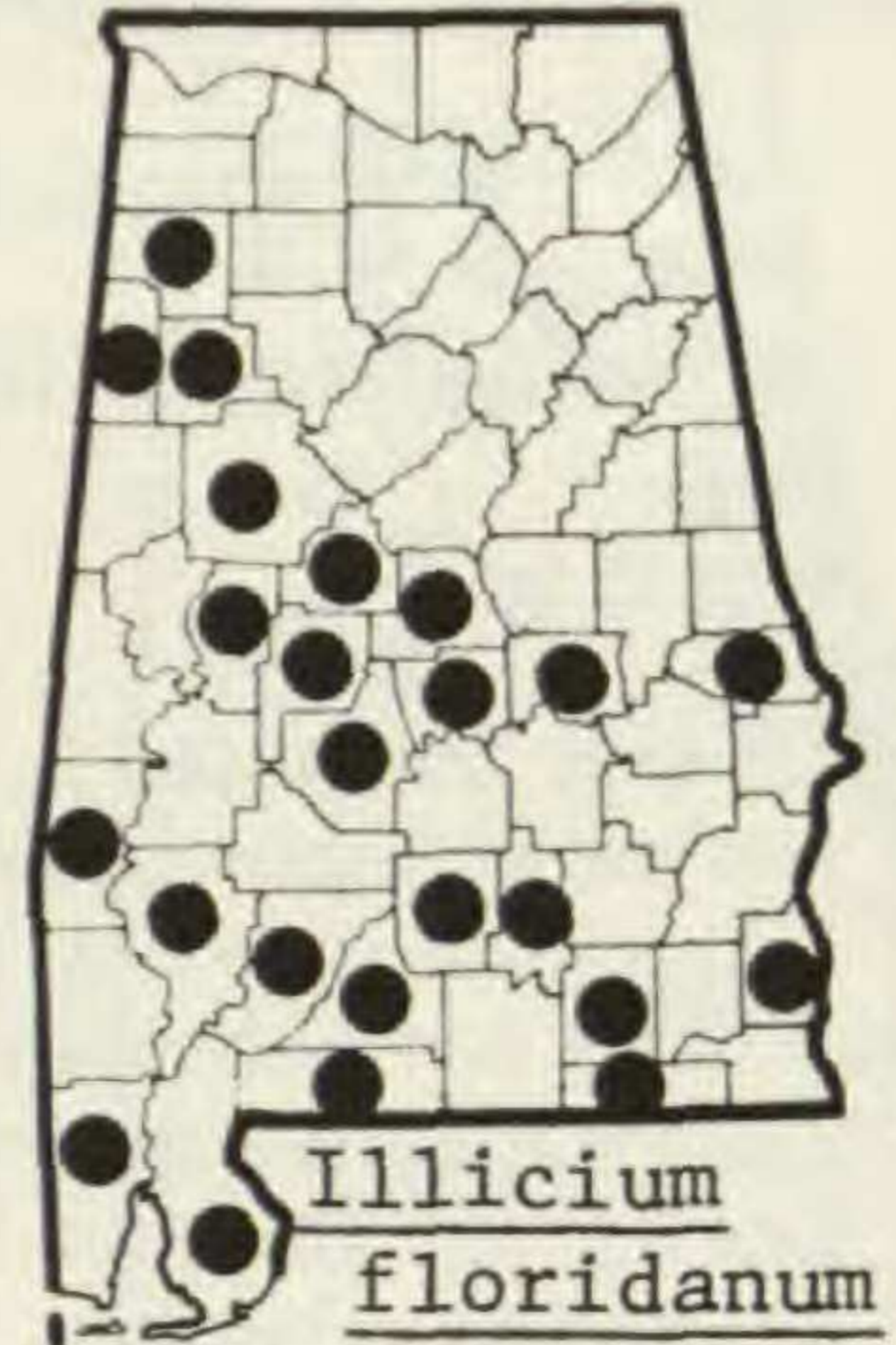
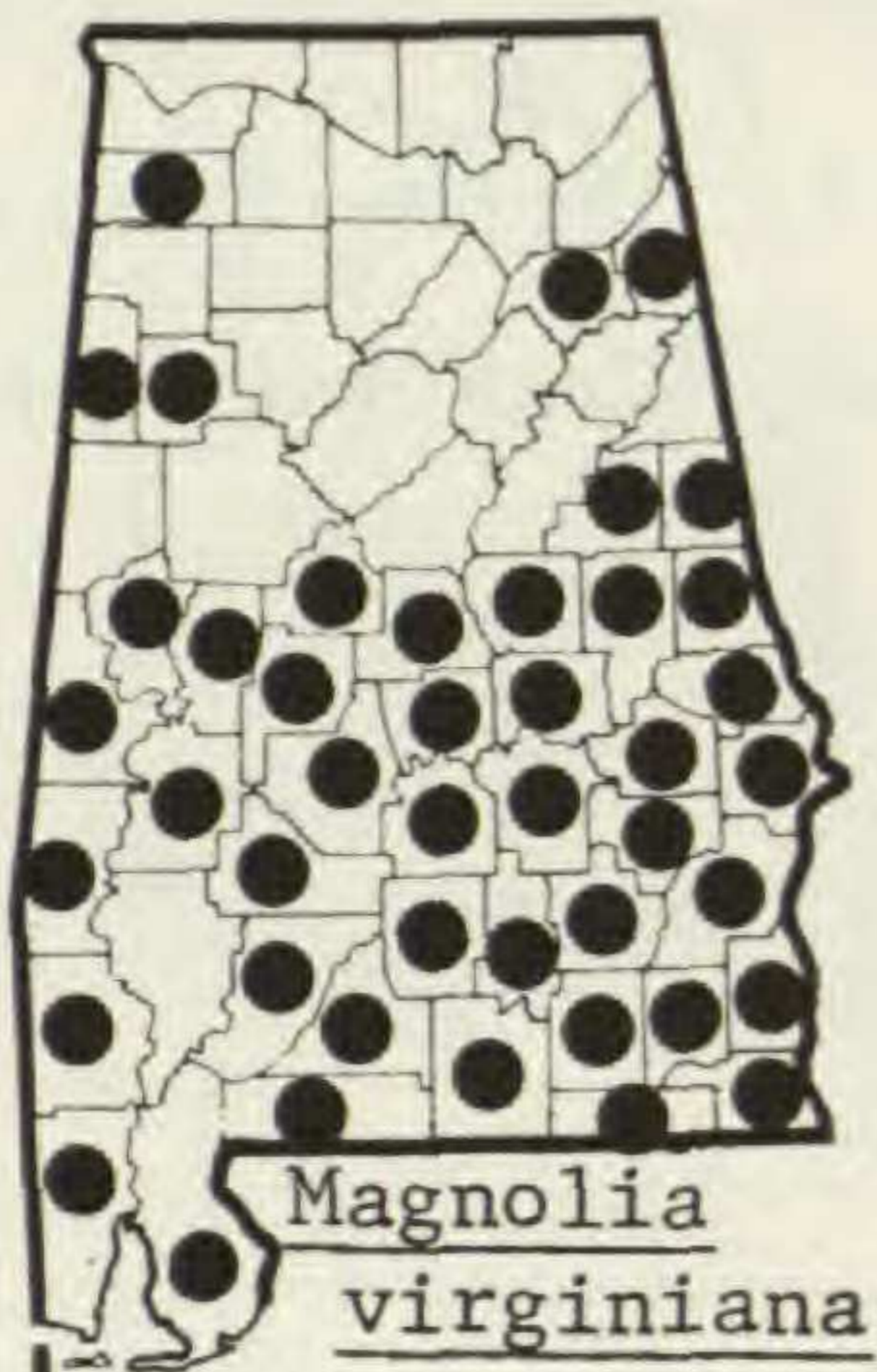
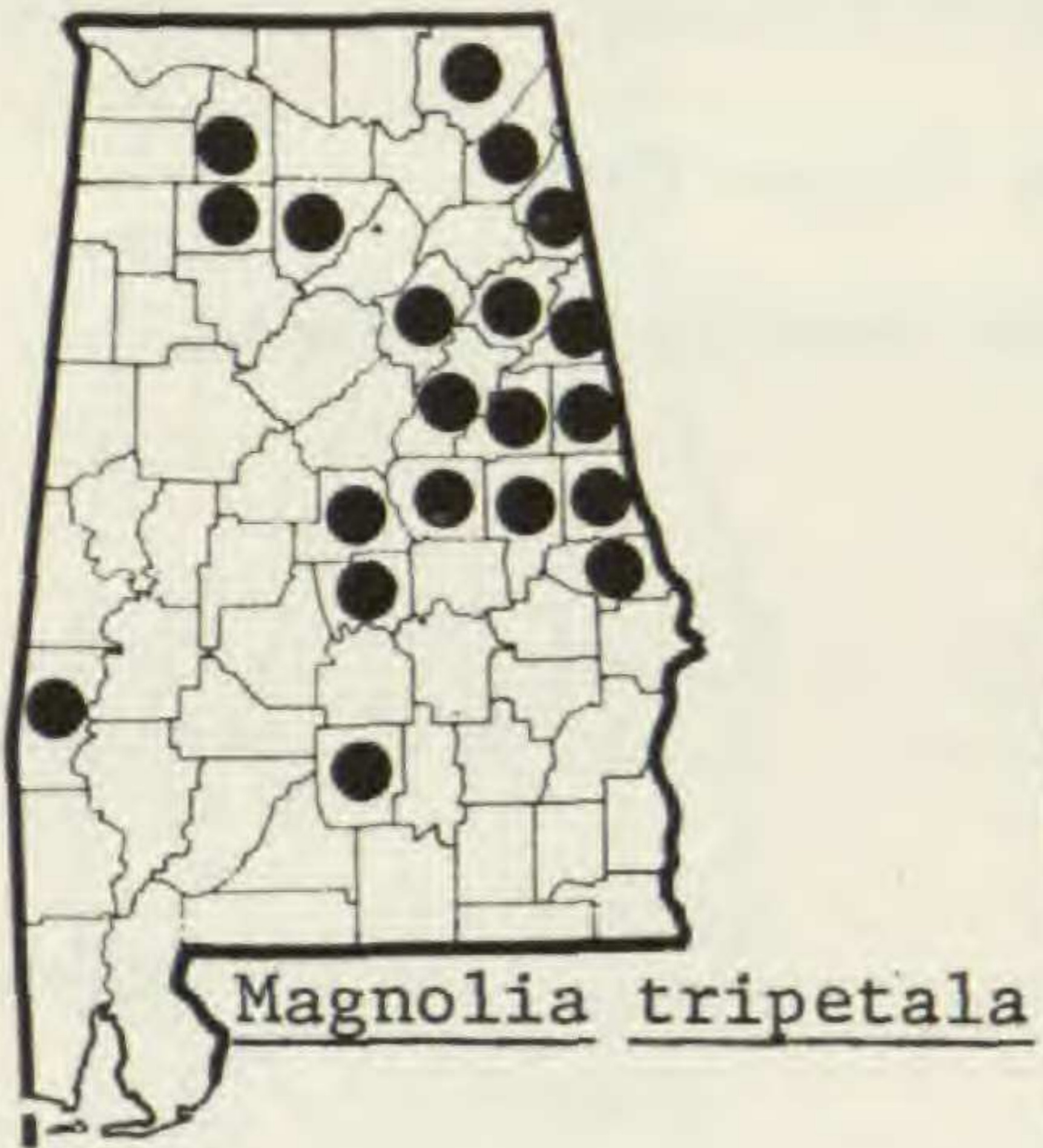
1. *I. floridanum* Ellis, STINKING LAUREL, STINKBUSH. Spring; fall. Low woods; principally CP.

## 22. ANNONACEAE

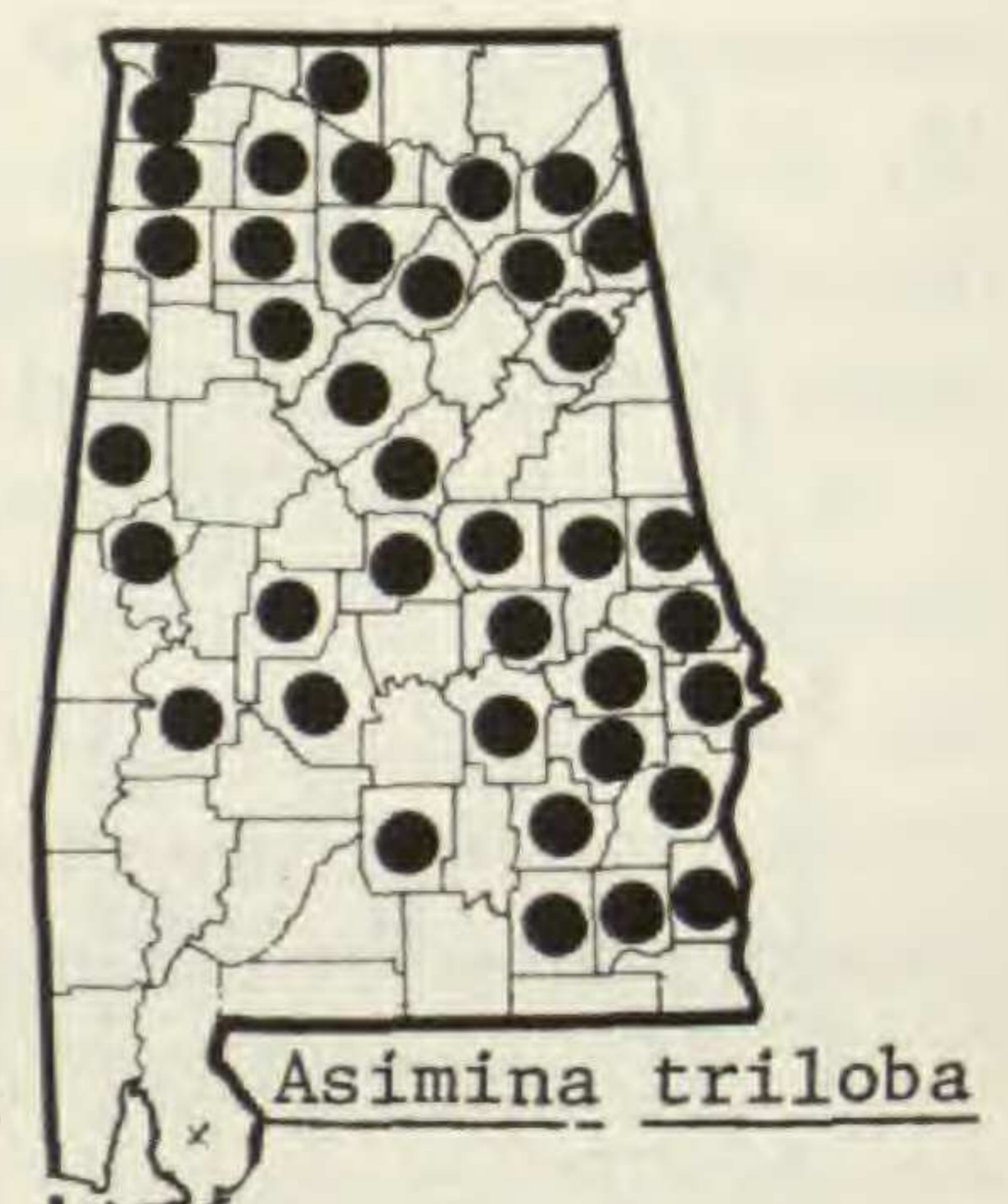
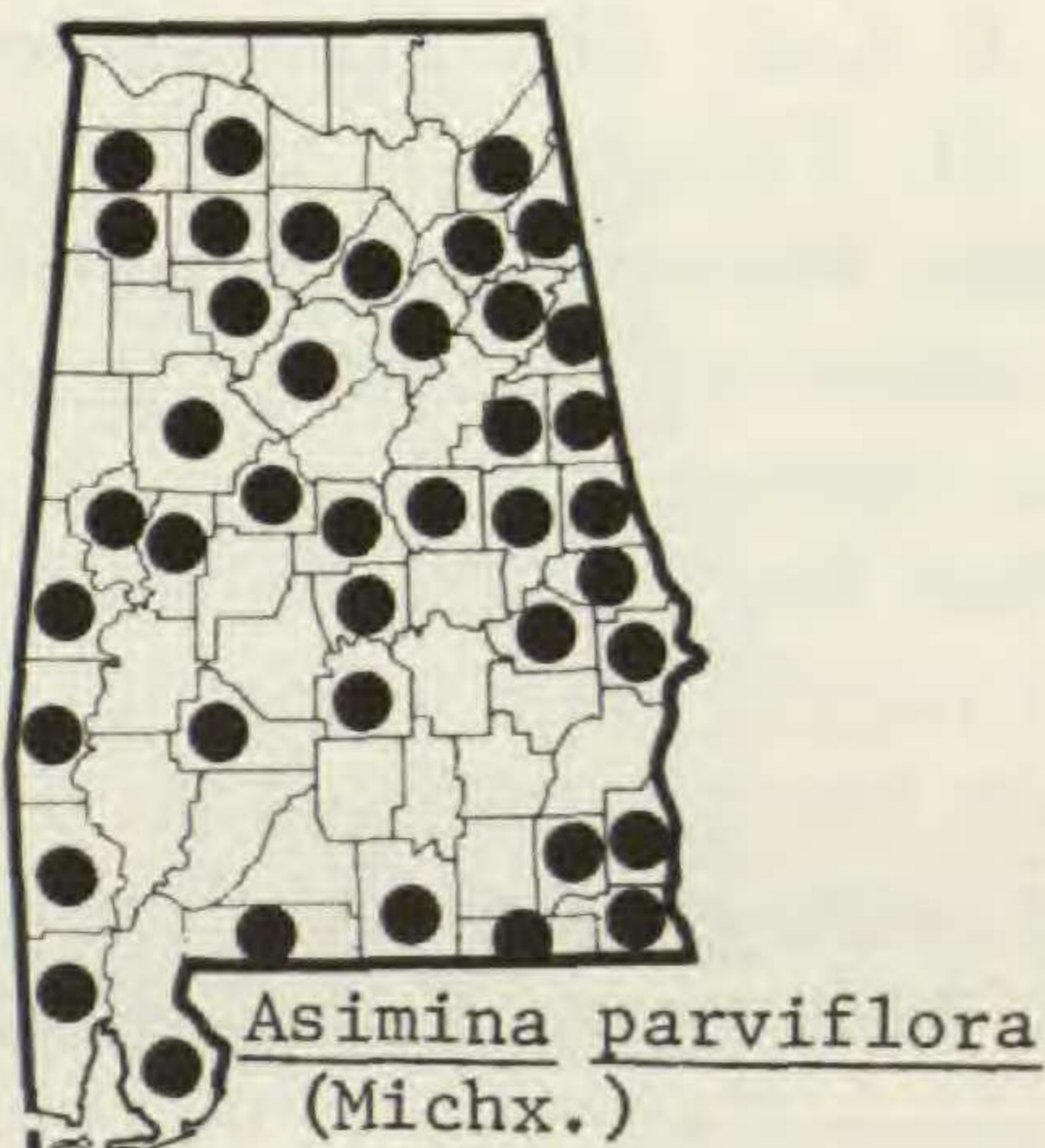
1. *Asimina* Adanson

1. Leaves averaging 6 times or more longer than broad, attenuate, narrowly oblanceolate to linear ..... 1. *A. longifolia*

21. ILLICIACEAE



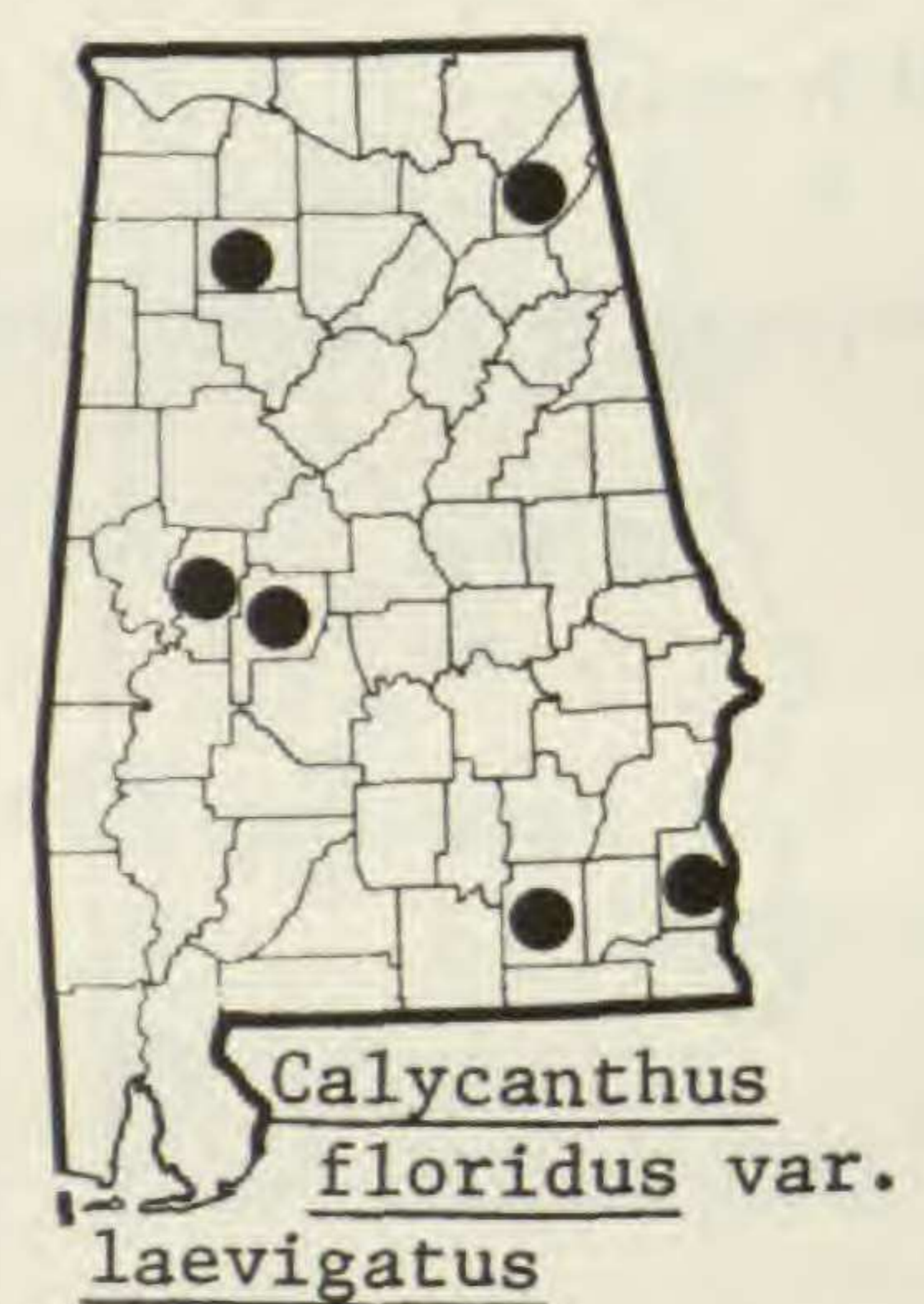
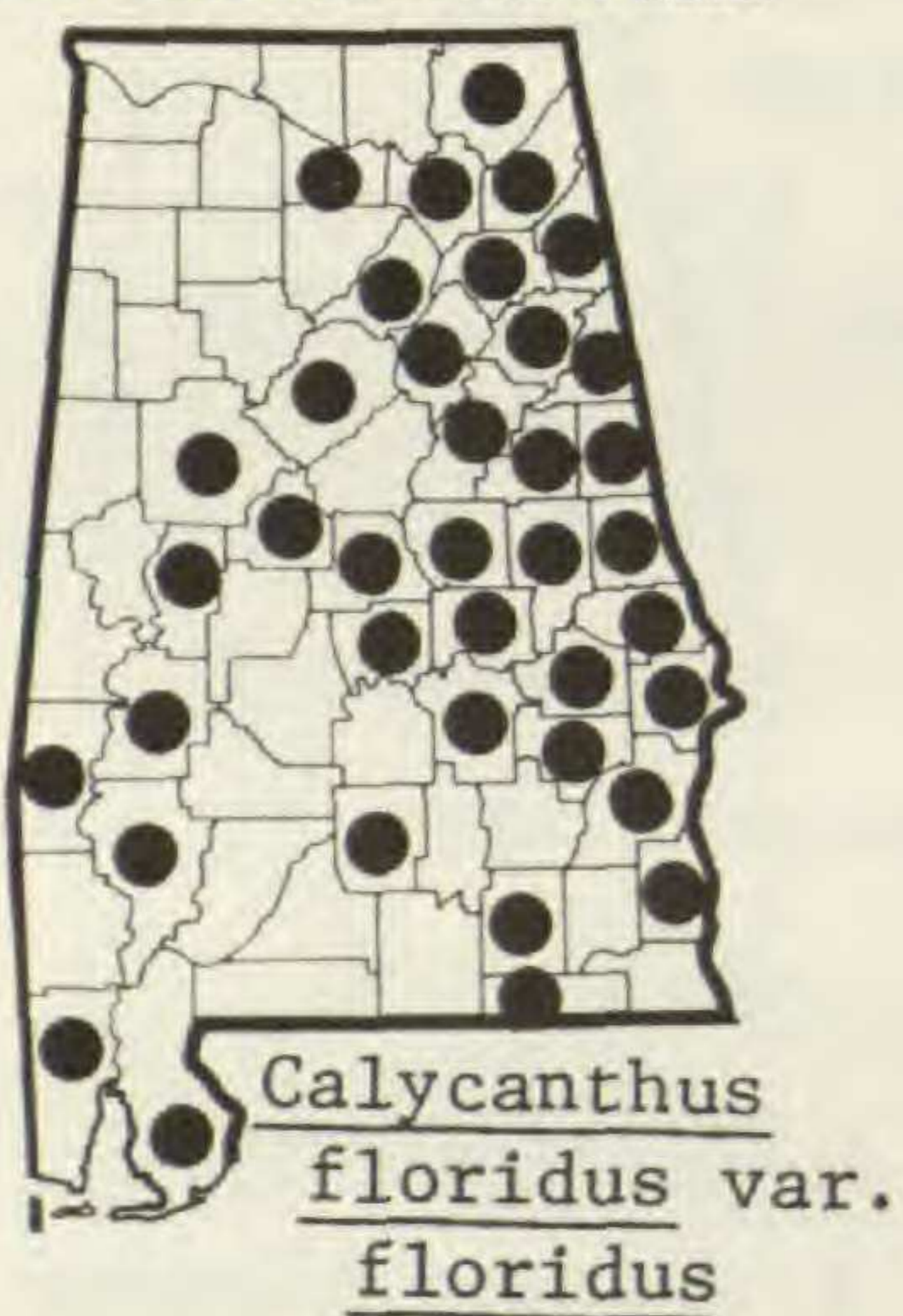
22. ANNONACEAE



23. SCHISANDRACEAE



24. CALYCANTHACEAE



1. Leaves averaging less than 4 times as long as broad, obtuse to cuneate, obovate to broadly oblanceolate ..... 2
  2. Flowers 2 cm or less broad; peduncles less than 8 mm long; fruit usually less than 3 cm long ..... *A. parviflora*
  2. Flowers more than 2 cm broad; peduncles 10 mm or more long; fruit usually more than 3 cm long ..... *A. triloba*
1. *A. longifolia* Kral var. *spathulata* Kral. Spring; summer. Open, sandy ground; southeastern OCP. *A. pygmaea* (Bartr.) Gray—M; *A. angustifolia* Gray—H; *Pityothamnus angustifolius* (Gray) Sm.—S.
2. *A. parviflora* (Michaux) Dunal, DWARF PAWPAW. Spring; summer-fall. Dry or mesic woods; throughout.
3. *A. triloba* (L.) Dunal, PAWPAW. Spring; summer-fall. Low or rich woods, infrequent; throughout.

## 23. SCHISANDRACEAE

1. *Schisandra* Michaux

1. *S. glabra* (Brickell) Rehder. Spring; summer. Rich woods, rare; western CP. *Schizandra coccinea* Michx.—M, H, S.

## 24. CALYCANTHACEAE

1. *Calycanthus* L.

1. *C. floridus* L., SWEET SHRUB. Spring; summer.

1. Leaves pubescent beneath ..... *C. floridus* var. *floridus*
1. Leaves glabrous or glabrate beneath ..... *C. floridus* var. *laevigatus*

*C. floridus* L. var. *floridus*. Low or mesic woods; CP, P, AM, CuP, VR. Much more common in eastern Alabama; rare westward. *Butneria florida* (L.) Kear.—M; *C. mohrii* Sm.—S.

*C. floridus* L. var. *laevigatus* (Willd.) Torrey & Gray. Low woods, rare; CP, CuP. *Butneria fertilis* (Walt.) Kear.—M; *C. nanus* (Loisel.) Sm., *C. fertilis* Walt.—S.

## 25. LAURACEAE

1. Leaves, at least some, lobed ..... 4. *Sassafras*
1. Leaves unlobed ..... 2
2. Leaves deciduous ..... 2. *Lindera*
2. Leaves evergreen or semi-evergreen ..... 3
3. Leaves pinnately veined ..... 3. *Persea*
3. Leaves palmately veined ..... 1. *Cinnamomum*

1. *Cinnamomum* Blume

1. *C. camphora* (L.) Nees & Ebermaier, CAMPHOR TREE. Flowers, fruit not seen. Escaped to low pinelands, rare; OCP. *Camphora camphora* (L.) Karst.—S.

2. *Lindera* Thunberg

1. Leaves, at least most, ovate to obovate ..... 1. *L. benzoin*
1. Leaves broadly lanceolate ..... 2. *L. melissaefolium*

25. LAURACEAE



Cinnamomum camphora



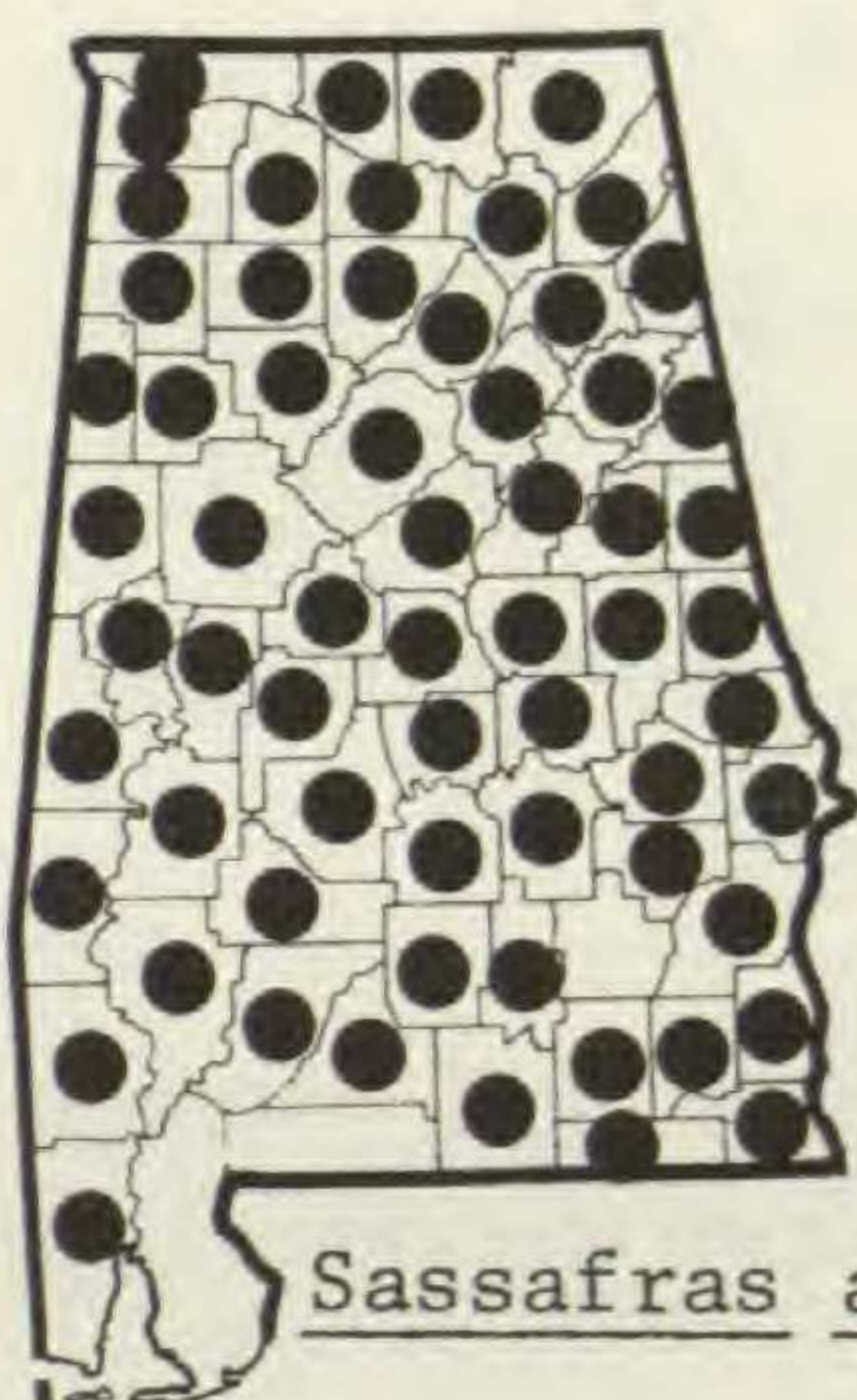
Lindera benzoin



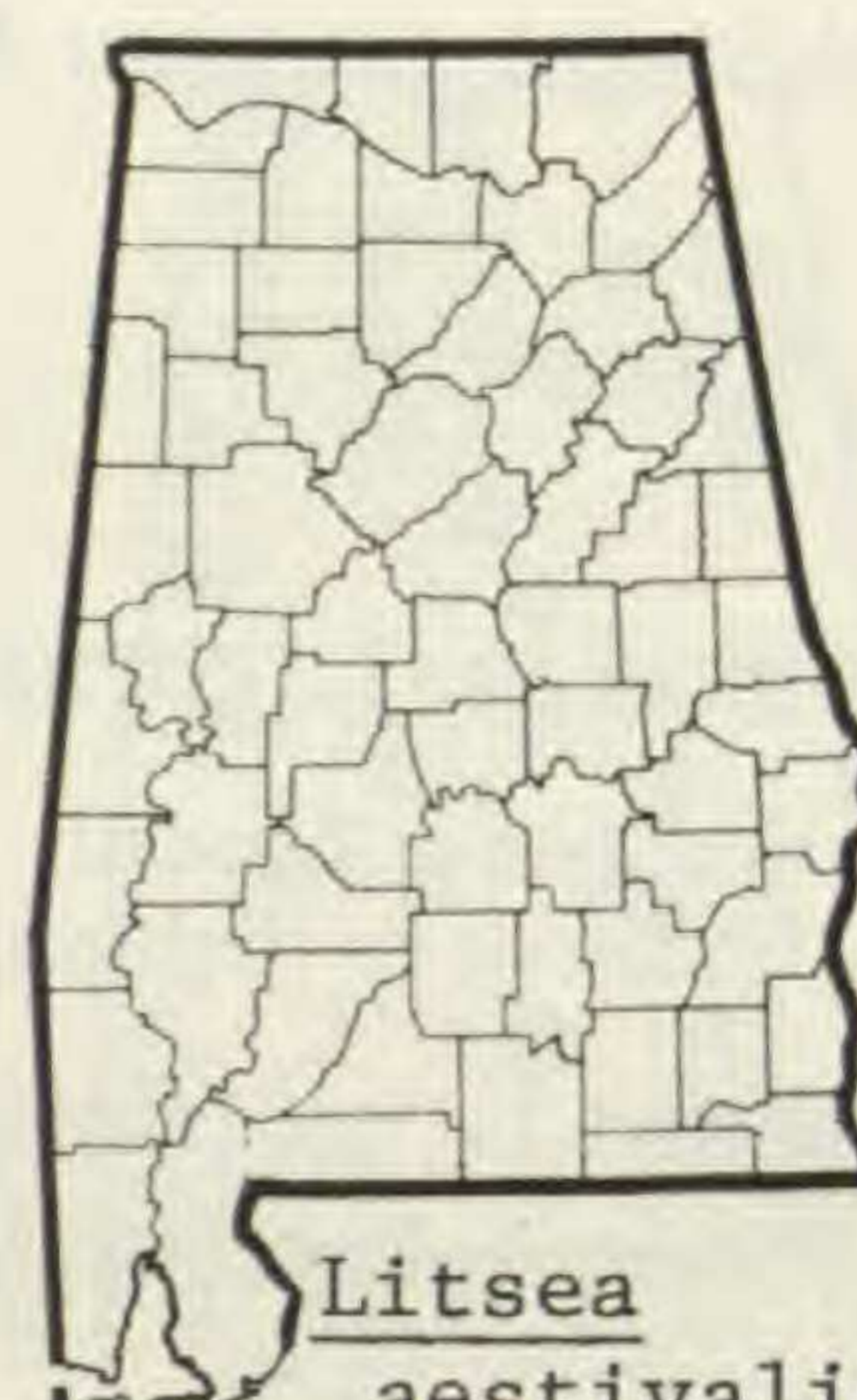
Lindera melissaefolium



Persea borbonia



Sassafras albidum



Litsea aestivalis

26. SAXIFRAGACEAE



Decumaria barbara



Hydrangea arborescens ssp. arborescens



Hydrangea arborescens ssp. discolor

1. *L. benzoin* (L.) Blume, SPICEBUSH. Spring; summer. Alluvial and rich, low woods; throughout, but infrequent southward. *Benzoin benzoin* (L.) Coult.—M; *B. aestivale* (L.) Nees—H, S.

2. *L. melissaefolium* (Walter) Blume. Spring; summer. Low thicket, extremely rare or extinct in Alabama; CP. *Benzoin melissaefolium* (Walt.) Nees—M, H, S.—Apparently not seen in Alabama since the time of Buckley's residence over 100 years ago.

### 3. *Persea* Miller

1. *P. borbonia* (L.) Sprengel, RED BAY. Spring; fall. Low, rich woods, infrequent; CP, southern CuP. *P. pubescens* (Pursh) Sarg.—M, H; *Tamala pubescens* (Pursh) Sm., *T. borbonia* (L.) Raf.—S.

### 4. *Sassafras* Trew ex Blackwell, SASSAFRAS

1. *S. albidum* (Nuttall) Nees. Spring; summer. Fencerows, fields, mesic woods; throughout. *S. sassafras* (L.) Karst.—M, S; *S. variifolium* (Sal.) Kuntz.—H.

*Litsea aestivalis* (L.) Fernald has been listed by Dean (1961), but no specimens have been seen by the writer.

## 26. SAXIFRAGACEAE

- |   |                        |
|---|------------------------|
| 1. Leaves alternate .....   | 2                      |
| 2. Ovary inferior; fruit a berry .....                                  | 5. <i>Ribes</i>        |
| 2. Ovary superior; fruit a capsule .....                                | 3. <i>Itea</i>         |
| 1. Leaves opposite .....  | 3                      |
| 3. Plant a creeping vine .....  | 1. <i>Decumaria</i>    |
| 3. Plant a shrub .....  | 4                      |
| 4. Stamens 20 or more; fruit longitudinally dehiscent, not ribbed ..... | 4. <i>Philadelphus</i> |
| 4. Stamens 10 or less; fruit poricidally dehiscent, ribbed .....        | 2. <i>Hydrangea</i>    |

### 1. *Decumaria* L.

1. *D. barbara* L. Spring; summer-fall. Moist woods; throughout.

### 2. *Hydrangea* L., HYDRANGEA

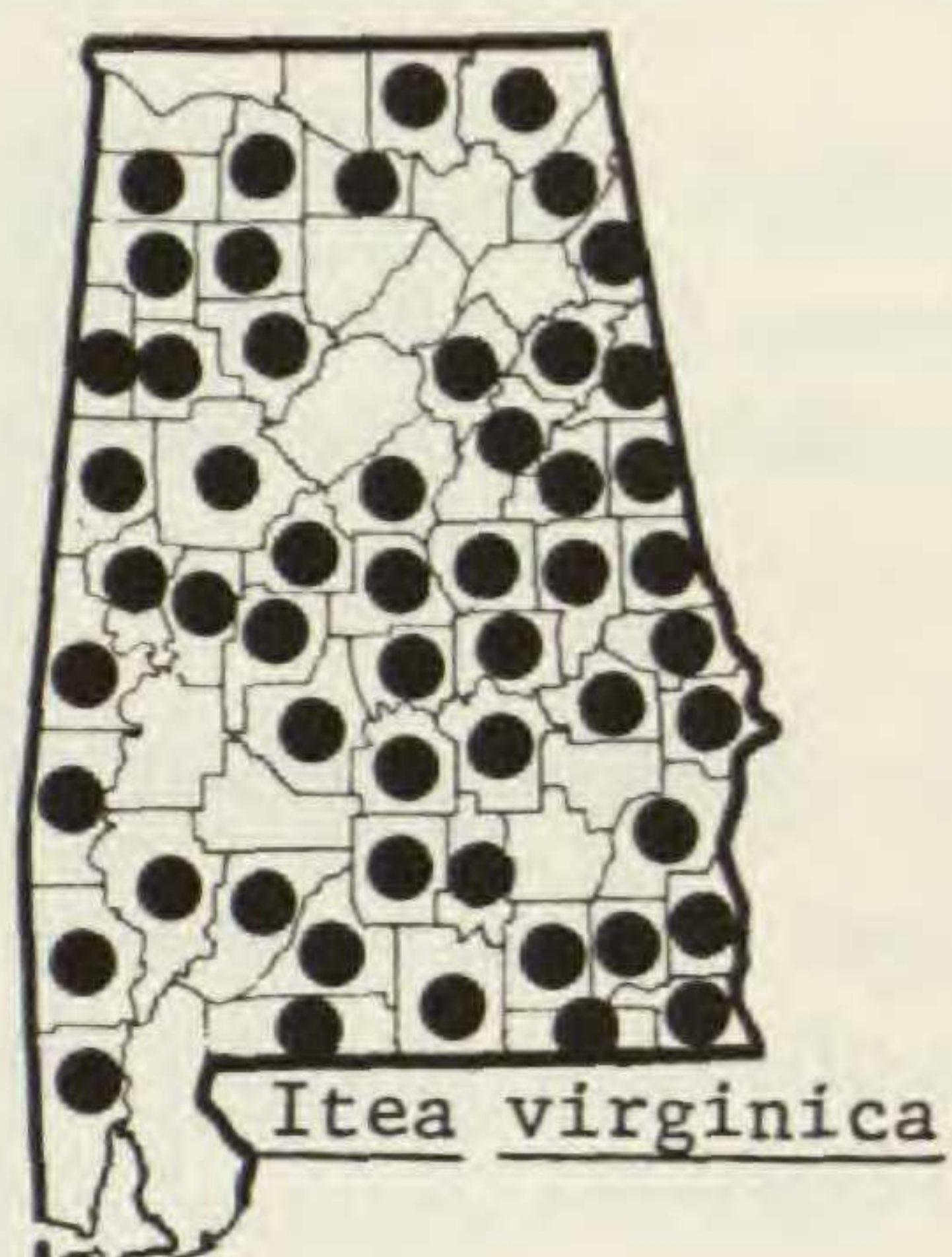
- |                         |                          |
|-------------------------|--------------------------|
| 1. Leaves unlobed ..... | 1. <i>H. arborescens</i> |
| 1. Leaves lobed .....   | 2. <i>H. quercifolia</i> |

1. *H. arborescens* L., WILD H. Summer; summer-fall.

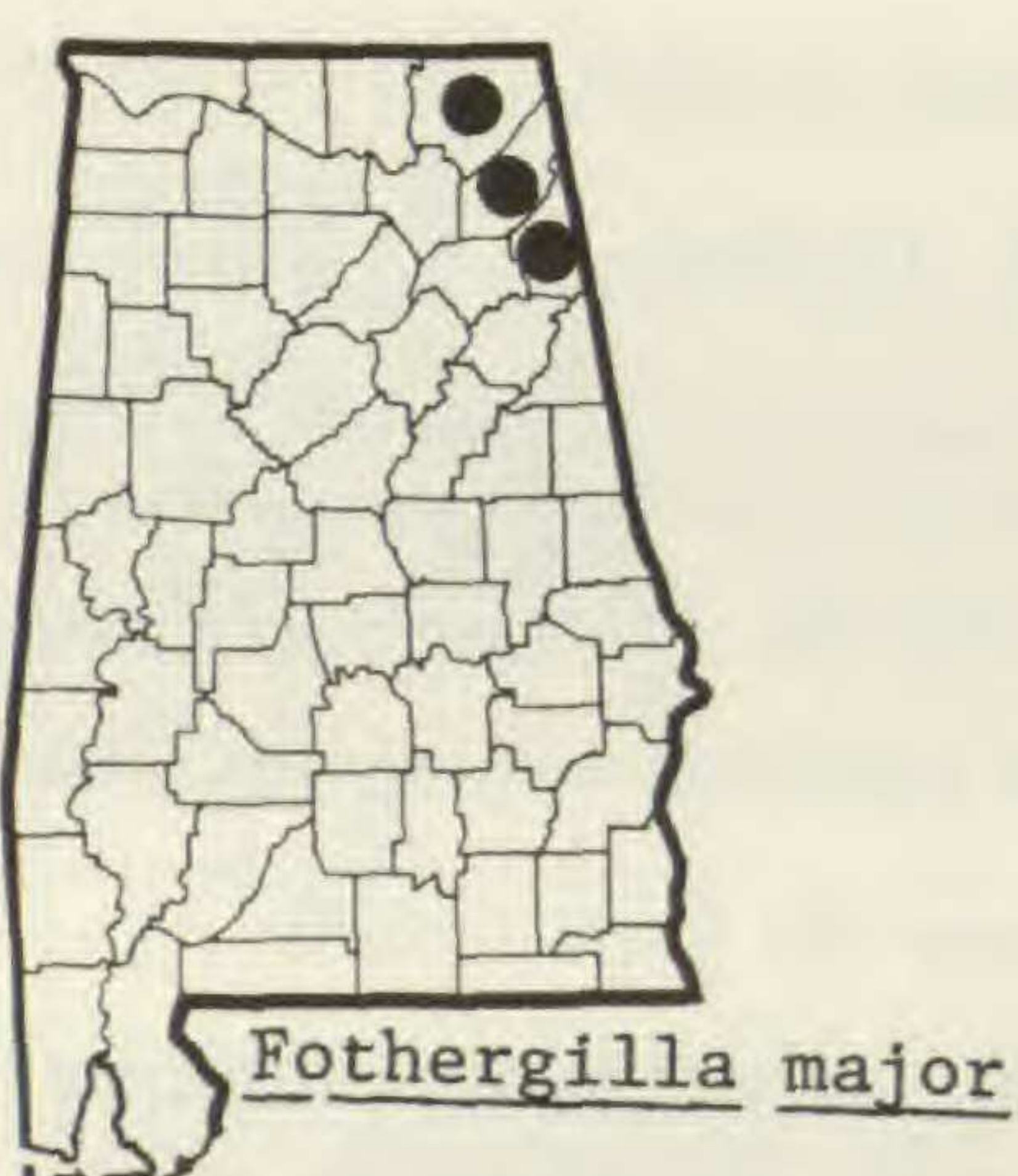
- |  |   |
|--|---|
| 1. Leaves glabrous beneath, or pubescent only on the principal veins ..... | <i>H. arborescens</i> subsp. <i>arborescens</i> |
| 1. Leaves pubescent beneath over the lower surfaces .....                  | <i>H. arborescens</i> subsp. <i>discolor</i>    |

*H. arborescens* L. subsp. *arborescens*. Rich or low woods; throughout, but infrequent southward.

*H. arborescens* subsp. *discolor* (Seringe) McClintock. Rich woods; throughout, except southern CP. *H. cinerea* Sm.—M, S; *H. arborescens cordata* (Pursh) T. & G.—M.



## 27. HAMAMELIDACEAE





2. *H. quercifolia* Bartram, SEVEN-BARK. Late spring-early summer; summer-fall. Rich or mesic woods; throughout.

### 3. *Itea* L.

1. *I. virginica* L. Spring-early summer; summer-fall. Seepages, ditches, streambanks; throughout.

### 4. *Philadelphus* L., MOCK-ORANGE

1. Pedicels and hypanthia pubescent ..... 1. *P. hirsutus*  
 1. Pedicels and hypanthia glabrous ..... 2. *P. inodorus*

1. *P. hirsutus* Nuttall. Spring; summer. Dry woods, open slopes, infrequent; AM, CuP, HR.

2. *P. inodorus* L. Spring; summer. Rich woods, infrequent; CP, P, CuP, VR. *P. grandiflorus* Willd.—M, S; *P. gloriosus* Bead.—S.

### 5. *Ribes* L., GOOSEBERRY

1. Hypanthium glandular ..... 1. *R. curvatum*  
 1. Hypanthium spiny, eglandular ..... 2. *R. cynosbati*

1. *R. curvatum* Small. Spring; summer. Rocky woods, rare; AM, CuP. *R. curvata* Sm.—M; *Grossularia curvata* (Sm.) Cov. & Britt.—S.

2. *R. cynosbati* L. Spring; summer. Rocky, mesic woods, rare; CuP. *Grossularia cynosbati* L.—S.

*Deutzia* sp. has been noted as escaped by Dean (1961), without locality.

## 27. HAMAMELIDACEAE

1. Leaves lobed ..... 3. *Liquidambar*  
 1. Leaves unlobed ..... 2  
 2. Flowers and fruit in terminal spikes; petals absent; stamens more than 4 ..... 1. *Fothergilla*  
 2. Flowers and fruit axillary; petals and stamens 4 ..... 2. *Hamamelis*

### 1. *Fothergilla* Murray

1. Filaments and capsules (including style) more than 10 mm long; leaves glabrous or glabrate above ..... 1. *F. gardenii*  
 1. Filaments and capsules (including style) less than 10 mm long; leaves evidently stellate-pubescent above ..... 2. *F. major*

1. *F. gardenii* Murray. Spring; summer-fall. Rocky woods, rare; CP, CuP, HR. *F. carolina* (L.) Britt.—M.

2. *F. major* (Sims) Lodd. Spring; summer-fall. Alluvial woods, rare; CuP.

The Alabama populations of this genus are in need of critical study.

### 2. *Hamamelis* L., WITCH-HAZEL

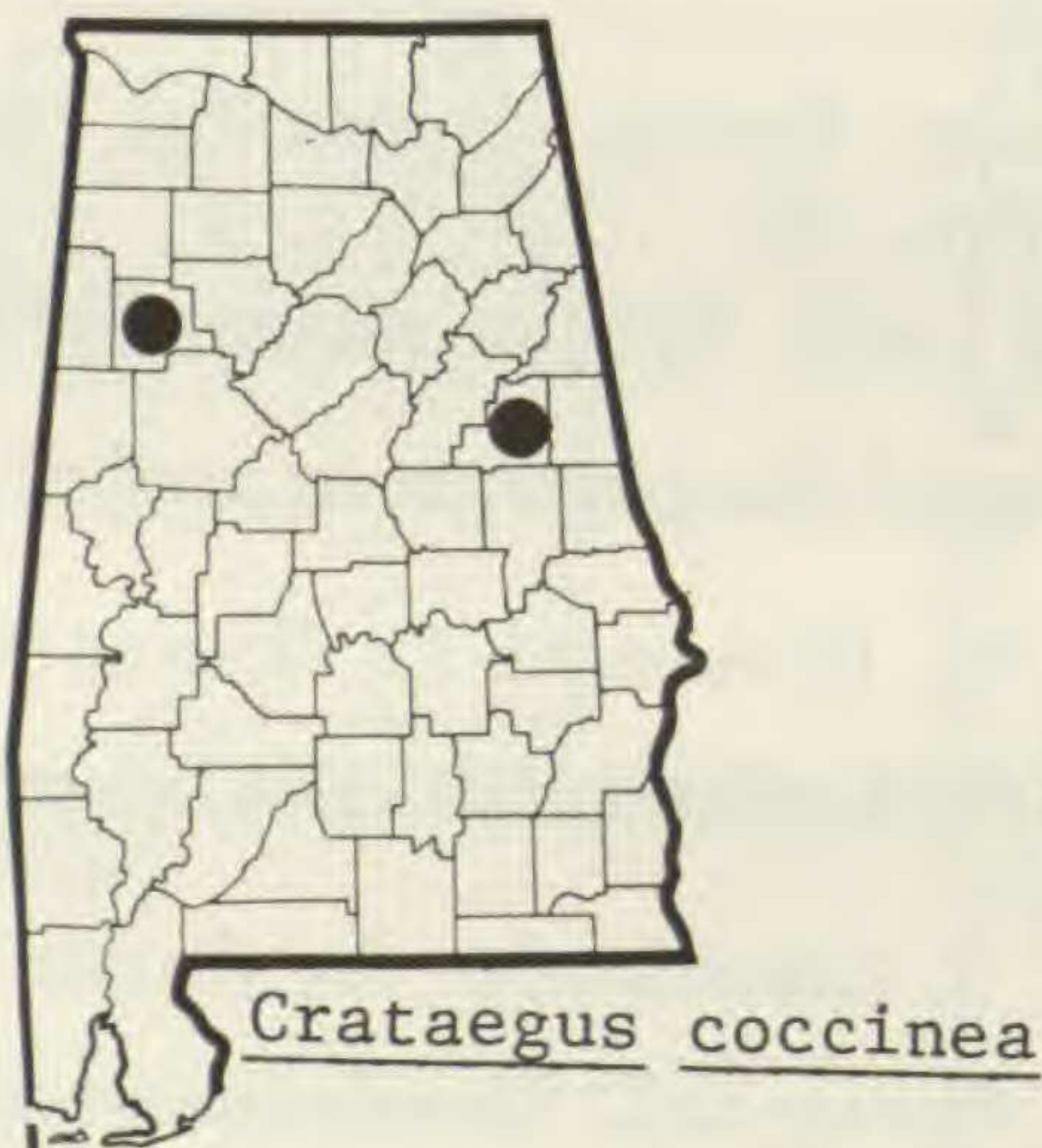
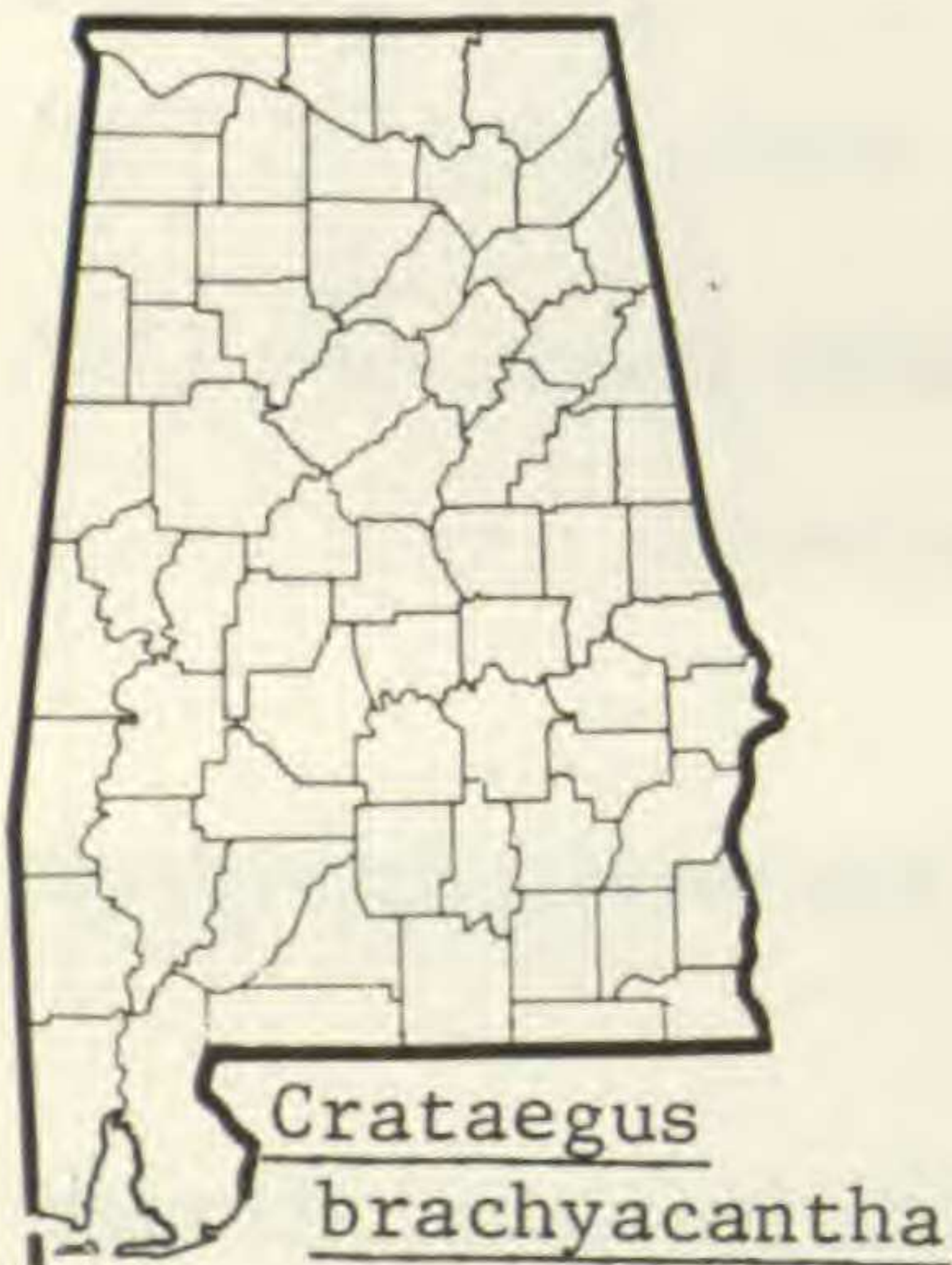
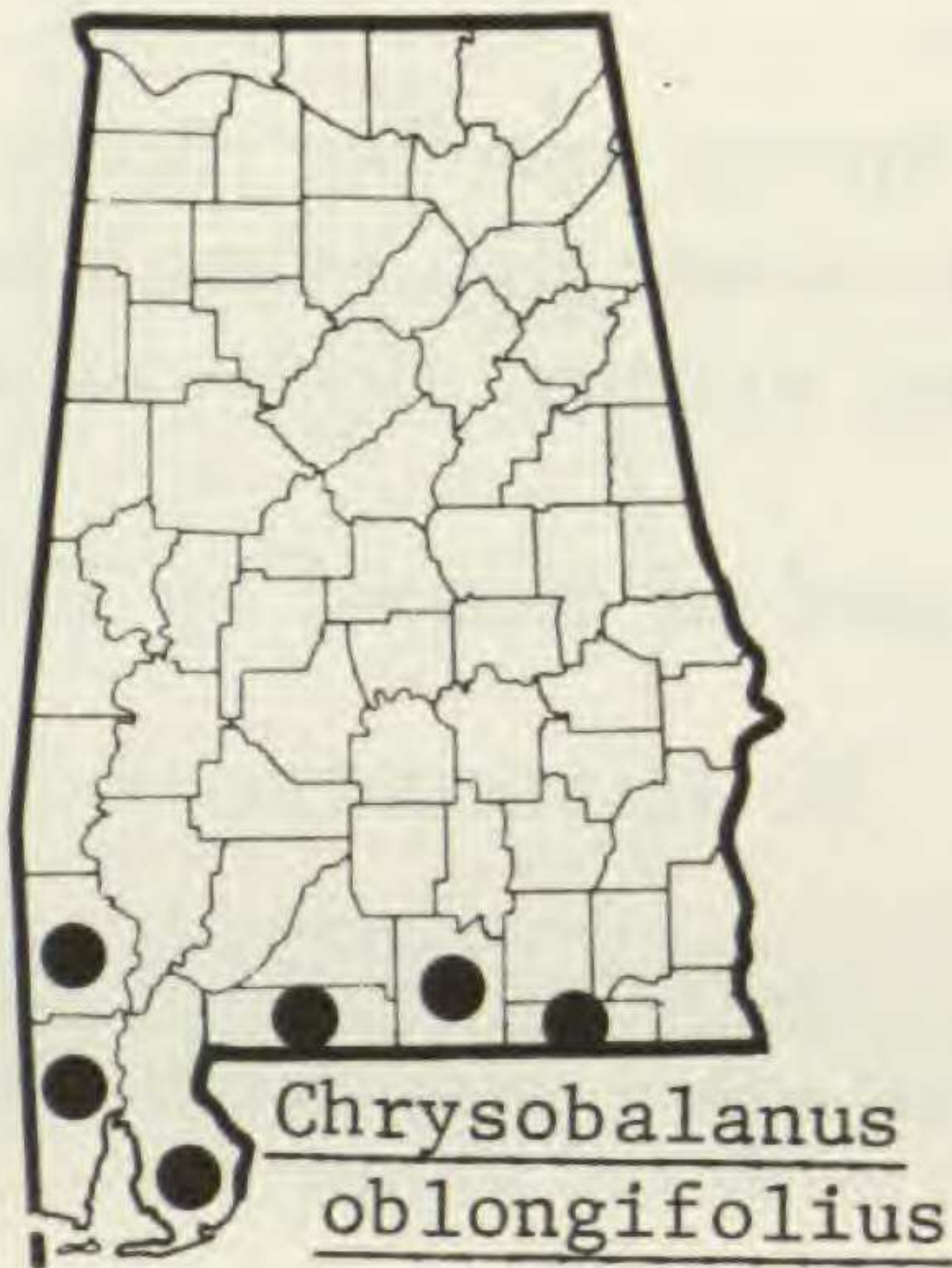
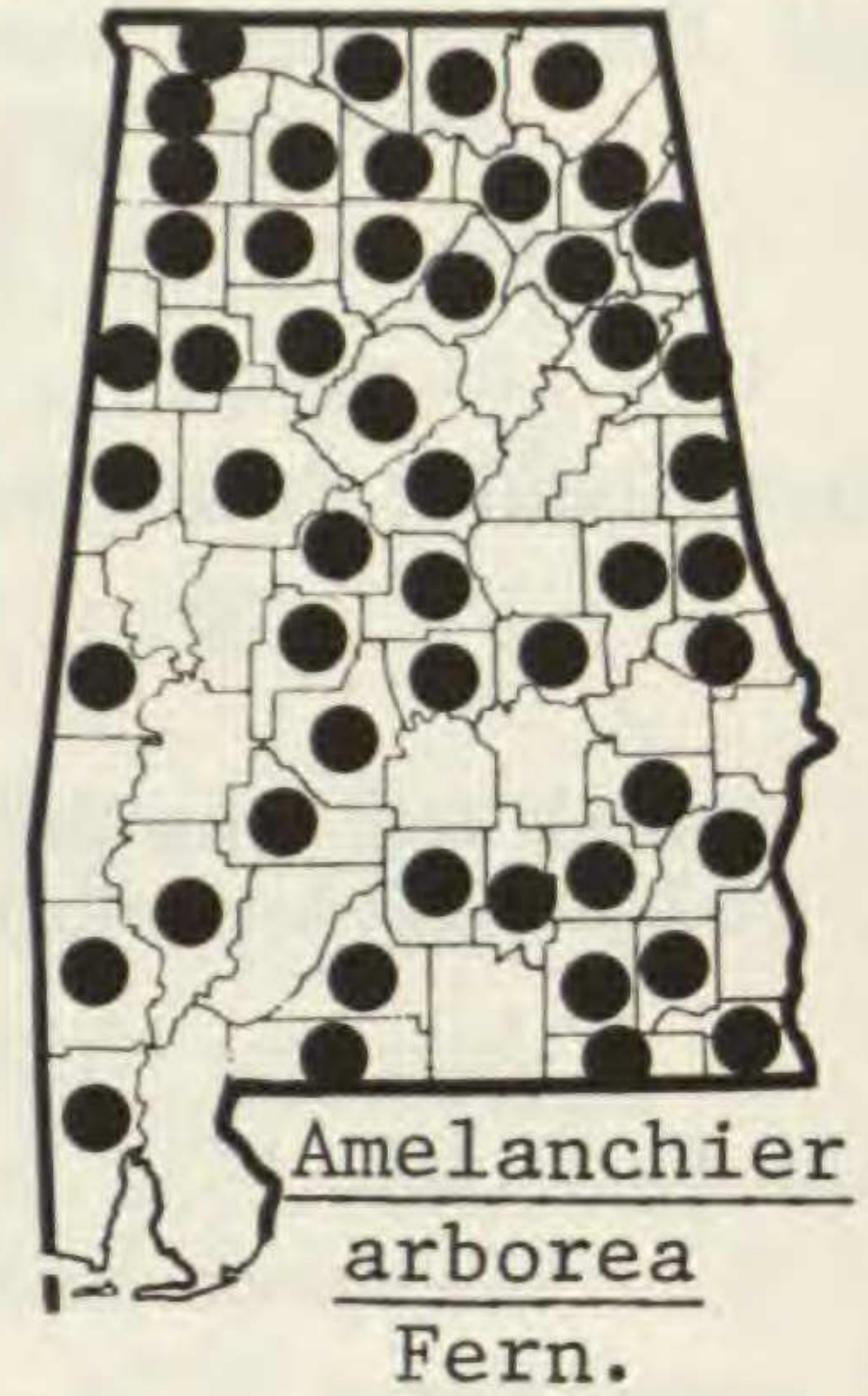
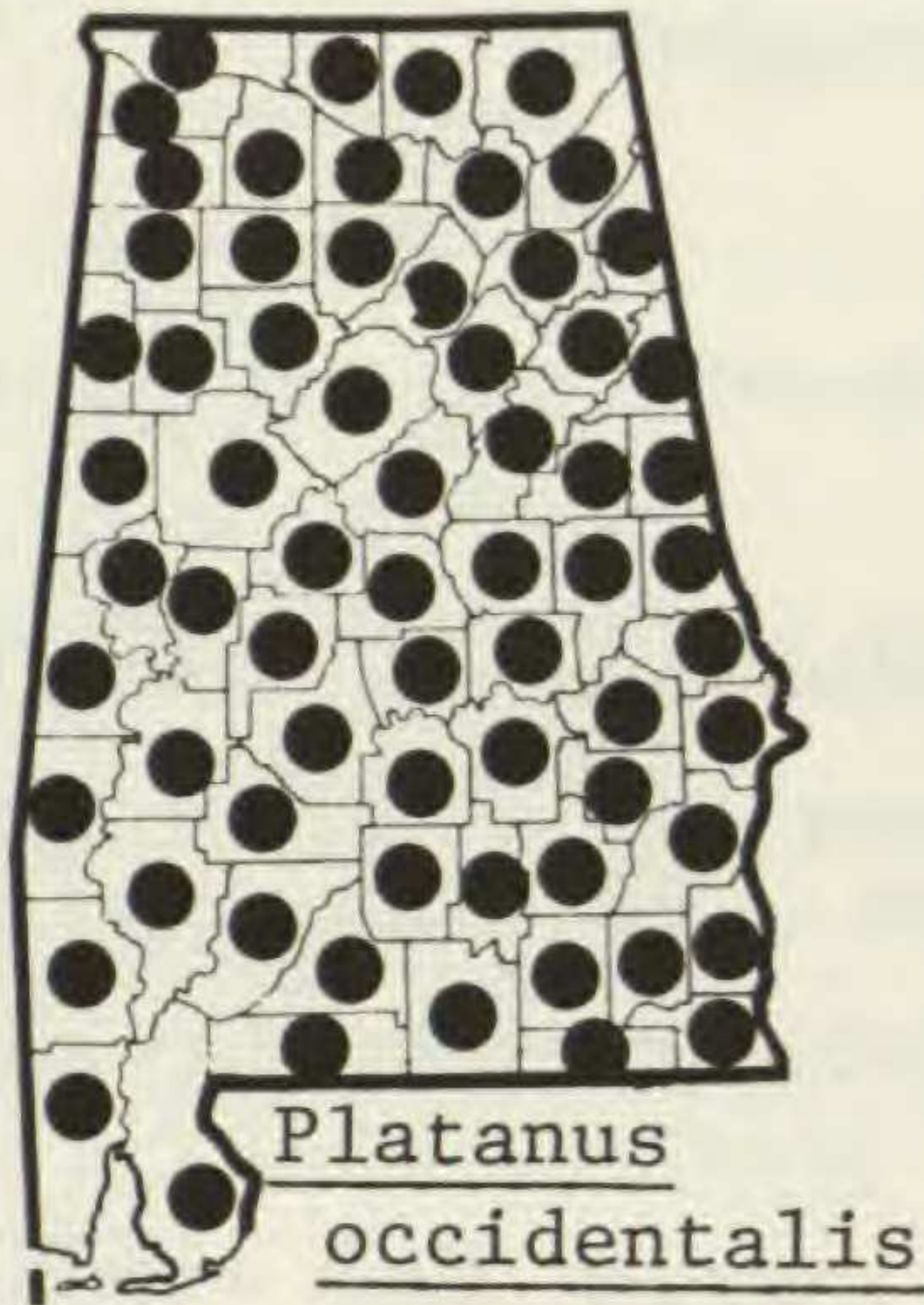
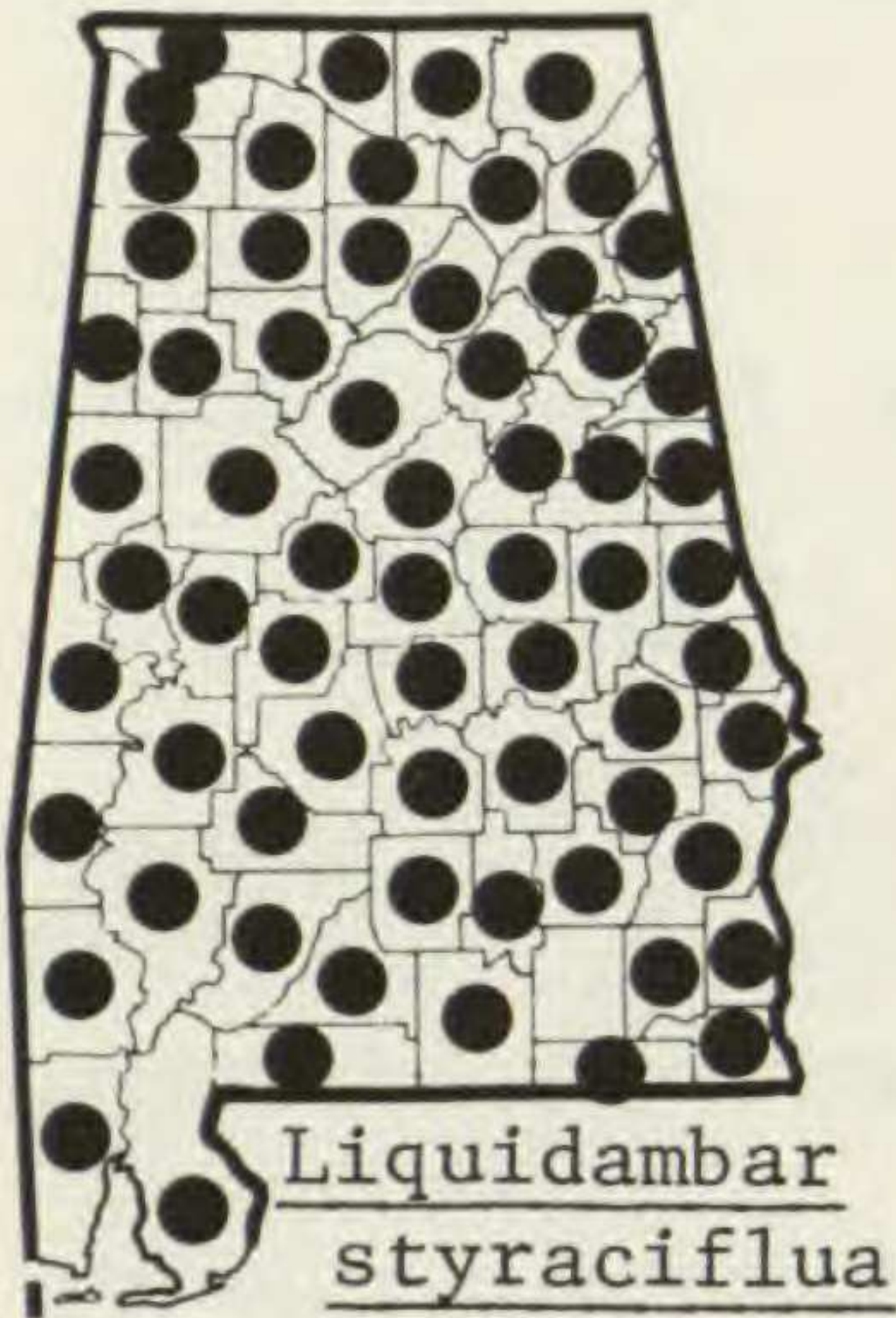
1. *H. virginiana* L. Fall-winter; fall. Dry, mesic and low woods; throughout.

### 3. *Liquidambar* L., SWEET GUM

1. *L. styraciflua* L. Spring; fall. Deciduous woods, fields, fencerows; throughout.

28. PLATANACEAE

29. ROSACEAE



## 28. PLATANACEAE

1. *Platanus* L., SYCAMORE

- 1.
- P. occidentalis*
- L. Spring; fall. Low woods; throughout.

## 29. ROSACEAE

- |   |                         |
|---|-------------------------|
| 1. Leaves pinnately compound .....  | 2                       |
| 2. Flower perigynous, ovaries and fruit enclosed within hypanthium; fruit not drupaceous .....                      | 10. <i>Rosa</i>         |
| 2. Flower hypogynous, ovaries and fruit borne above calyx on elongated torus; fruit an aggregate of drupelets ..... | 11. <i>Rubus</i>        |
| 1. Leaves simple, palmately compound, or absent at anthesis .....   | 3                       |
| 3. Leaves palmately compound .....  | 11. <i>Rubus</i>        |
| 3. Leaves simple, or absent at anthesis .....   | 4                       |
| 4. Plant in flower .....  | 5                       |
| 5. Corolla absent .....   | 5. <i>Neviusia</i>      |
| 5. Corolla present .....  | 6                       |
| 6. Ovary inferior, or partially so .....  | 7                       |
| 7. Inflorescence racemose .....   | 1. <i>Amelanchier</i>   |
| 7. Inflorescence corymbose or axillary-solitary .....   | 8                       |
| 8. Inflorescence a compound corymb or axillary-solitary .....   | 9                       |
| 9. Plant thornless; leaves crenate, unlobed .....   | 12. <i>Sorbus</i>       |
| 9. Plant with thorns or leaves lobed .....  | 10                      |
| 10. Leaves evergreen .....  | 8. <i>Pyracantha</i>    |
| 10. Leaves deciduous .....  | 3. <i>Crataegus</i>     |
| 8. Inflorescence a simple corymb .....  | 11                      |
| 11. Petals white; leaves entire to serrulate .....  | 9. <i>Pyrus</i>         |
| 11. Petals pink, often fading to white; leaves coarsely crenate or serrate to lobed .....                           | 4. <i>Malus</i>         |
| 6. Ovary superior .....   | 12                      |
| 12. Pistil 1 .....  | 13                      |
| 13. Flowers in racemes, umbellate fascicles, or axillary-solitary; petals white or pink .....                       | 7. <i>Prunus</i>        |
| 13. Flowers in panicles; petals yellow-green .....  | 2. <i>Chrysobalanus</i> |
| 12. Pistils 2 or more .....   | 14                      |
| 14. Leaves lobed; flowers more than 2 cm broad; petals purple .....   | 11. <i>Rubus</i>        |
| 14. Leaves unlobed or flowers less than 1 cm broad; petals white .....  | 15                      |
| 15. Flowers in panicles or compound corymbs .....   | 13. <i>Spiraea</i>      |
| 15. Flowers in simple corymbs .....   | 16                      |
| 16. Leaves cuneate .....  | 13. <i>Spiraea</i>      |
| 16. Leaves rounded to truncate .....  | 6. <i>Physocarpus</i>   |
| 4. Plant in fruit .....   | 17                      |
| 17. Fruit an aggregate of drupelets .....   | 11. <i>Rubus</i>        |
| 17. Fruit not an aggregate of drupelets .....   | 18                      |
| 18. Fruit a pome .....  | 19                      |
| 19. Inflorescence a raceme .....  | 1. <i>Amelanchier</i>   |
| 19. Inflorescence a corymb .....  | 20                      |
| 20. Corymbs compound .....  | 21                      |
| 21. Midrib pubescent beneath with tawny trichomes ..  | 12. <i>Sorbus</i>       |
| 21. Midrib not pubescent beneath with tawny trichomes ..  | 22                      |
| 22. Leaves evergreen .....  | 8. <i>Pyracantha</i>    |
| 22. Leaves deciduous .....  | 3. <i>Crataegus</i>     |
| 20. Corymbs simple .....  | 23                      |
| 23. Endocarp indurate, bony .....   | 24                      |
| 24. Leaves evergreen .....  | 8. <i>Pyracantha</i>    |
| 24. Leaves deciduous .....  | 3. <i>Crataegus</i>     |
| 23. Endocarp cartilaginous or chartaceous .....   | 25                      |

- |     |  |                         |
|-----|--|-------------------------|
|     | 25. Leaves entire to serrulate; flesh of fruit gritty .....  | 9. <i>Pyrus</i>         |
|     | 25. Leaves coarsely crenate or serrate to lobed; flesh<br>of fruit not gritty .....                    | 4. <i>Malus</i>         |
| 18. | Fruit follicular or drupaceous .....   | 26                      |
| 26. | Fruit solitary in fruiting calyx .....   | 27                      |
|     | 27. Inflorescences terminating principal stems; leaves evergreen<br>.....                              | 2. <i>Chrysobalanus</i> |
|     | 27. Inflorescences axillary or terminating short side branches;<br>leaves deciduous or evergreen ..... | 7. <i>Prunus</i>        |
| 26. | Fruits commonly 2 or more per fruiting calyx .....   | 28                      |
| 28. | Leaves 3-veined from base .....  | 6. <i>Physocarpus</i>   |
| 28. | Leaves pinnately veined, not 3-veined from base .....  | 29                      |
|     | 29. Inflorescence axillary-solitary or cymose .....  | 5. <i>Neviusia</i>      |
|     | 29. Inflorescence corymbose .....  | 13. <i>Spiraea</i>      |

### 1. *Amelanchier* Medicus, SARVICE-BERRY

- |    |   |                         |
|----|---|-------------------------|
| 1. | Sepal bases and hypanthium neck glabrous .....  | 1. <i>A. arborea</i>    |
| 1. | Sepal bases and hypanthium neck pubescent ..... | 2. <i>A. canadensis</i> |

1. *A. arborea* (Michaux f.) Fernald. Spring; spring-summer. Upland, mesic and alluvial woods; throughout. *A. botryapium* (L. f.) DC.—M; *A. canadensis* (L.) Medic.—H, S; *A. alabamensis* Britt.—S.

2. *A. canadensis* Medicus. Spring; spring-summer. Hedgerow, rare; CP.

*Amelanchier sanguinea* (Pursh) DC. and *A. arborea* var. *laevis* (Wiegand) Ahles have been reported from Alabama, but no specimens have been seen by the writer.

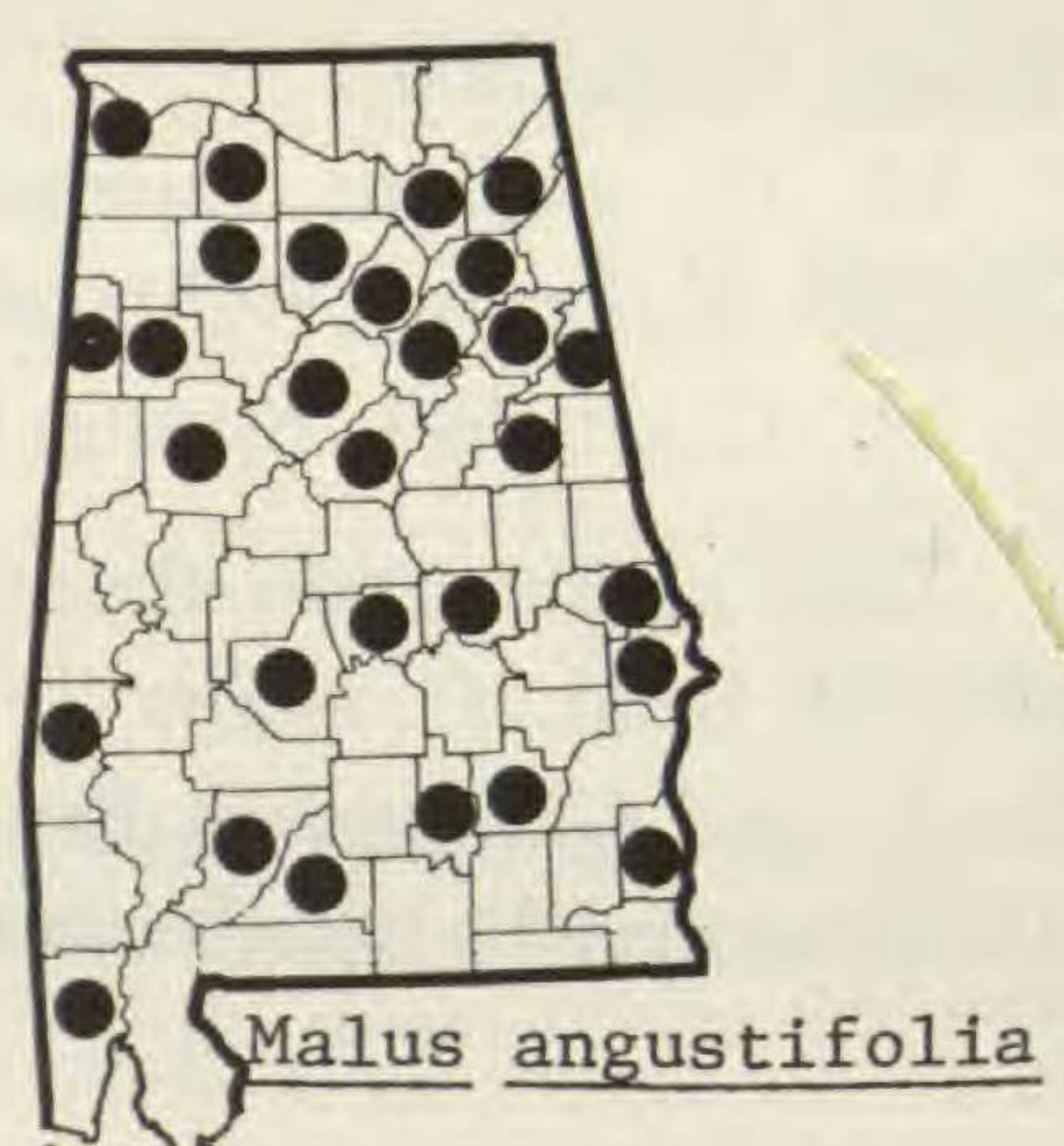
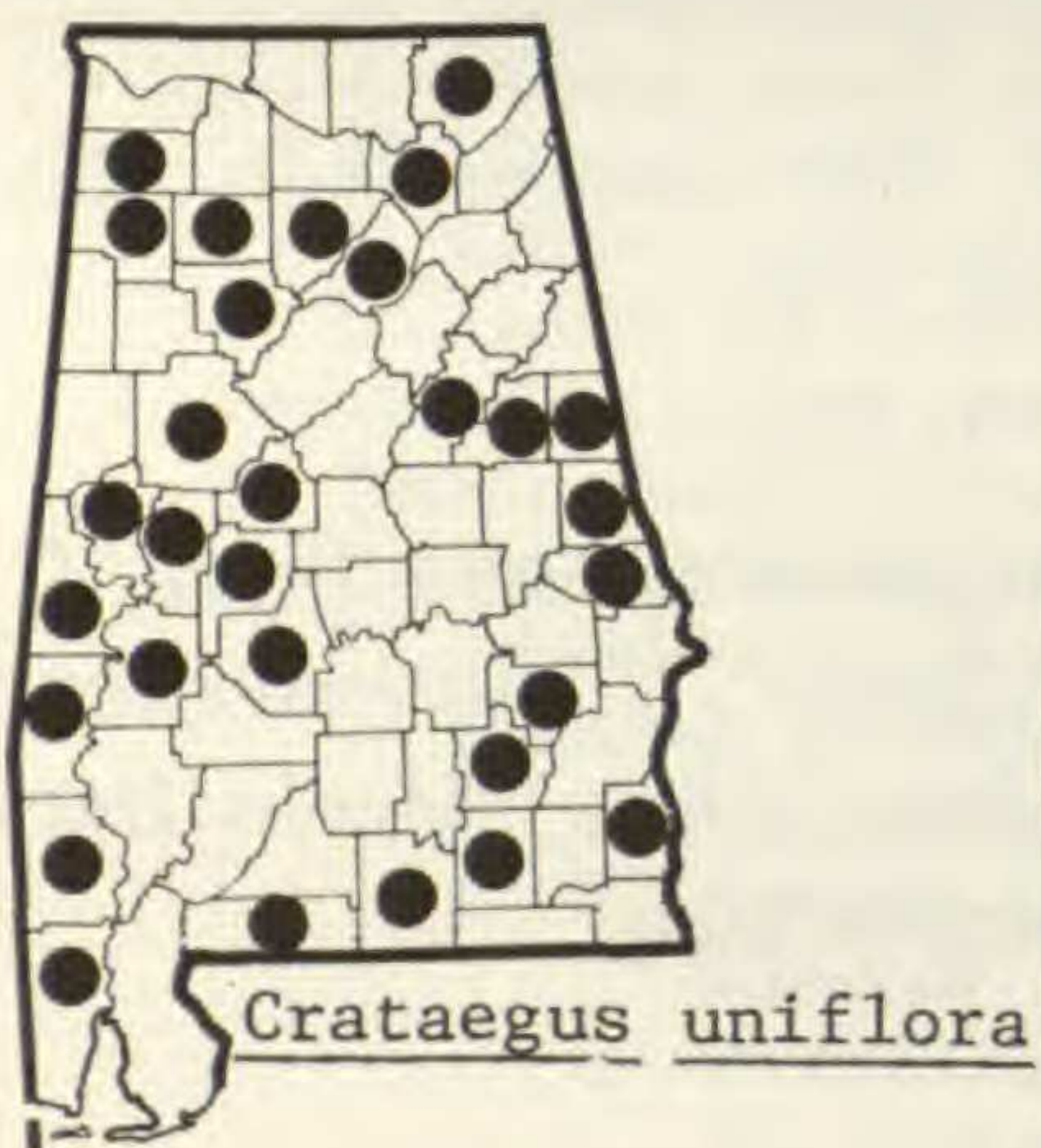
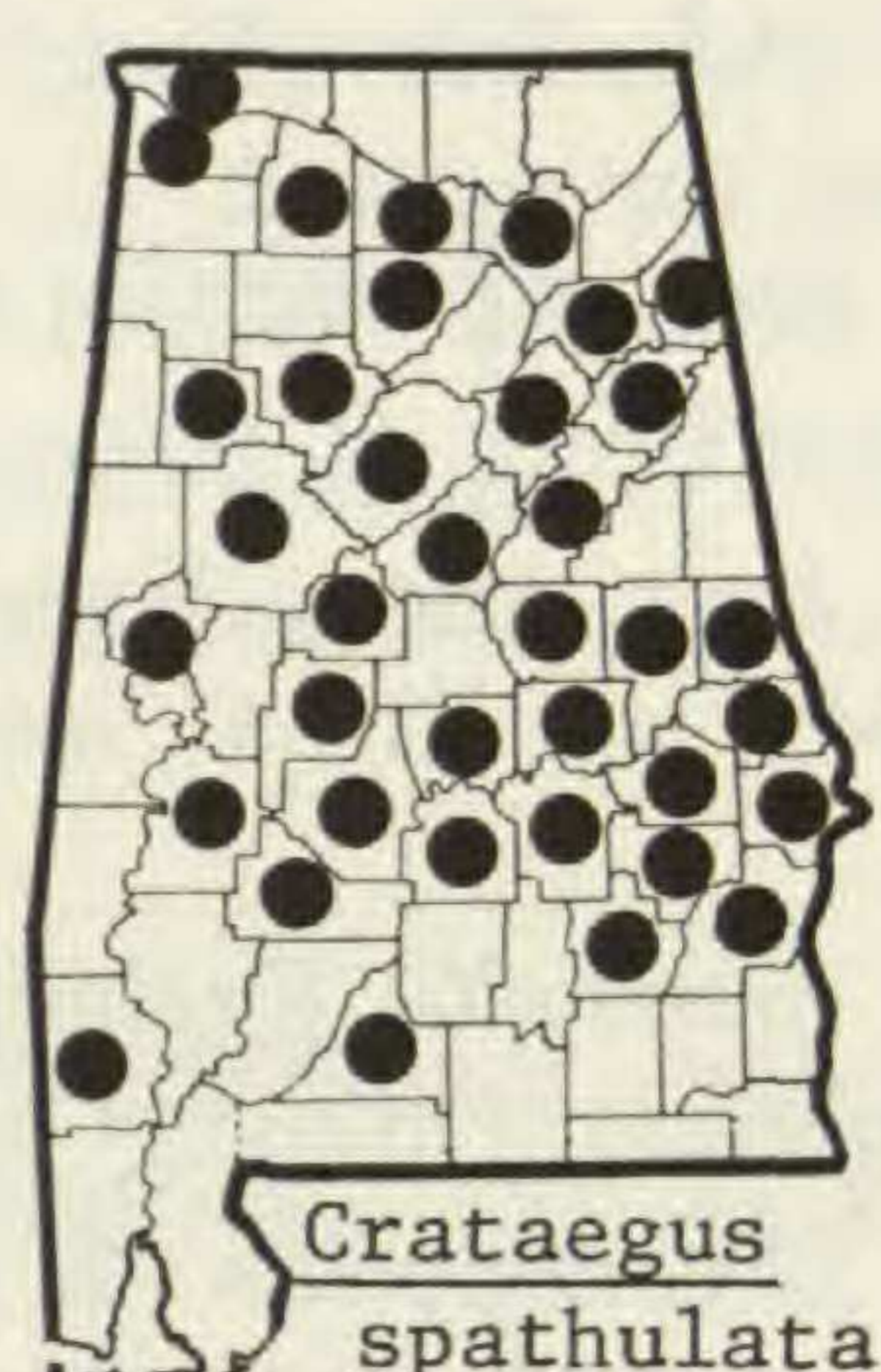
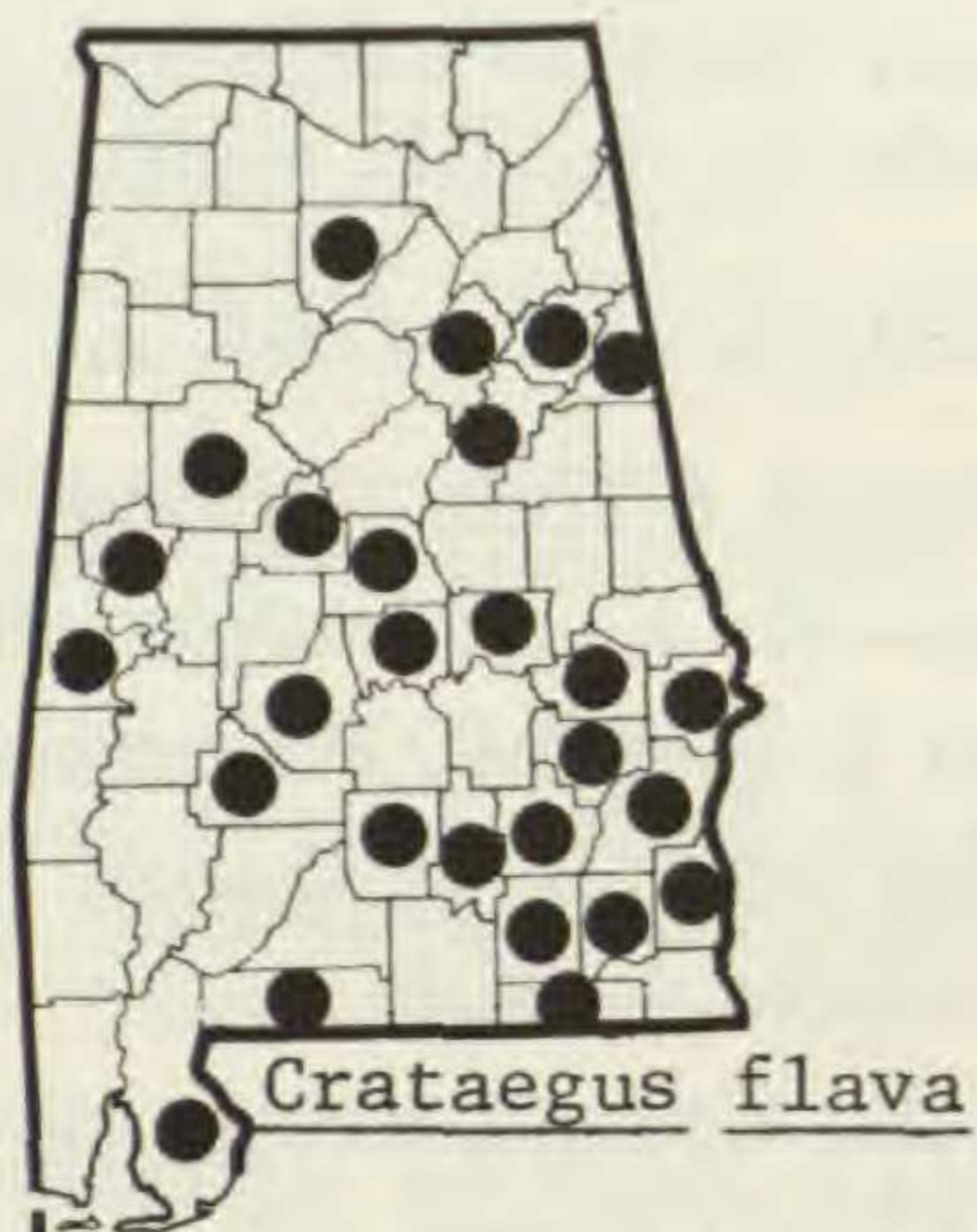
### 2. *Chrysobalanus* L.

1. *C. oblongifolius* Michaux, GOPHER-APPLE, SWEET-SHRUB. Spring-early summer; fall. Sandy woods; OCP. *Geobalanus oblongifolius* (Michx.) Sm.—S.

### 3. *Crataegus* L., HAWTHORN

- |     |  |                            |
|-----|--|----------------------------|
| 1.  | Leaves predominantly cuneate to attenuate .....                                      | 2                          |
| 2.  | Sepals glandular-serrate .....   | 3                          |
|     | 3. Glands on petioles sessile .....  | 4                          |
|     | 4. Flowers usually 2-3 in an inflorescence .....                                     | 6. <i>C. flava</i>         |
|     | 4. Flowers usually solitary .....  | 11. <i>C. uniflora</i>     |
| 3.  | Glands on petioles stalked .....   | 5                          |
|     | 5. Leaves serrate to base .....  | 9. <i>C. punctata</i>      |
|     | 5. Leaves not serrate to base .....  | 11. <i>C. uniflora</i>     |
| 2.  | Sepals entire or only remotely glandular-serrate .....                               | 6                          |
| 6.  | Leaves usually 3-lobed apically, spatulate .....                                     | 10. <i>C. spathulata</i>   |
| 6.  | Leaves not 3-lobed apically, not spatulate .....                                     | 7                          |
|     | 7. Branches of inflorescence pubescent .....   | 9. <i>C. punctata</i>      |
|     | 7. Branches of inflorescence glabrous .....  | 8                          |
|     | 8. Leaves lustrous above, rarely lobed; fruit more than 9 mm long .....              | 9                          |
|     | 9. Pyrenes usually 2; inflorescence compound, usually more than 3-<br>flowered ..... | 4. <i>C. crus-galli</i>    |
|     | 9. Pyrenes usually 3-5; inflorescence simple, 1-3-flowered .....                     | 10                         |
|     | 10. Leaves pubescent beneath .....   | 1. <i>C. aestivalis</i>    |
|     | 10. Leaves glabrous beneath .....  | 2. <i>C. brachyacantha</i> |
|     | 8. Leaves dull above, often lobed; fruit less than 9 mm long .....                   | 12. <i>C. viridis</i>      |
| 1.  | Leaves predominantly rounded, truncate or cordate .....                              | 11                         |
| 11. | Veins running to the sinuses as well as to the lobe apices .....                     | 12                         |
|     | 12. Leaves lobed; inflorescence glabrous or glabrate .....                           | 8. <i>C. phaenopyrum</i>   |





1. *M. angustifolia* (Aiton) Michaux, CRAB-APPLE. Spring; summer-fall. Upland thickets, woods; throughout.

2. *M. coronaria* (L.) Miller, CRAB-APPLE. Spring; summer-fall. Upland thickets, woods, infrequent to rare; CP, AM, CuP. *M. glaucescens* Rehd., *M. bracteata* Rehd.—S.

3. *M. pumila* Miller, COMMON A. Spring; summer-fall. Occasional escape; throughout.

Species 1 and 2 are in need of concurrent biosystematic evaluation.

#### 5. *Neviusia* Gray

1. *N. alabamensis* Gray. Spring; fall. Rich woods over calcareous substrata, very rare; southern CuP, reported from HR.—One of the rarest and most celebrated taxa in Alabama. Known elsewhere from Arkansas and Missouri (Steyermark, 1963).

#### 6. *Physocarpus* Maximowicz, NINEBARK

1. *P. opulifolius* (L.) Maximowicz. Spring; summer-fall. Rocky or alluvial woods, rare; P, CuP, VR, reported from HR. *P. stellatus* (Rydb.) Rehd.—H; *Opulaster opulifolius* (L.) Kuntze—M, H, S; *O. alabamensis* Rydb.—H, S; *O. intermedius* Rydb., *O. australis* Rydb.—S.

#### 7. *Prunus* L.

- |   |   |
|---|---|
| 1. Inflorescence racemose .....   | 2   |
| 2. Leaves evergreen; petioles not glandular .....                                       | 3. <i>P. caroliniana</i>                            |
| 2. Leaves deciduous; petioles usually glandular distally with 1-2 sessile glands .....  | 5. <i>P. serotina</i>                               |
| 1. Inflorescence fasciculate or axillary .....  | 3   |
| 3. Pedicels 2 mm or less long .....   | 4. <i>P. persica</i>                                |
| 3. Pedicels more than 5 mm long .....   | 4   |
| 4. Leaves absent; plant in flower .....   | 5   |
| 5. Petals averaging 7.5 mm or more in length .....                                      | 1. <i>P. americana</i>                              |
| 5. Petals averaging less than 7 mm in length .....                                      | 2. <i>P. angustifolia</i> or 6. <i>P. umbellata</i> |
| 4. Leaves present or plant in fruit .....   | 6   |
| 6. Teeth of leaf margin conspicuously glandular .....                                   | 2. <i>P. angustifolia</i>                           |
| 6. Teeth of leaf margin not conspicuously glandular .....                               | 7   |
| 7. Leaves abruptly acuminate, usually doubly serrate; stone more than 1 cm long .....   | 1. <i>P. americana</i>                              |
| 7. Leaves acute or gradually acuminate, simply serrate; stone less than 1 cm long ..... | 6. <i>P. umbellata</i>                              |

There are no apparent characteristics which will differentiate flowering individuals of *P. angustifolia* Marshall from those of *P. umbellata* Ell.

1. *P. americana* Marshall, WILD PLUM. Spring; summer.

- |  |   |
|--|---|
| 1. Pedicels and calyx tubes glabrous; leaves glabrous beneath or pubescent only near the principal veins ..... | <i>P. americana</i> var. <i>americana</i> |
| 1. Pedicels and calyx tubes pubescent; leaves densely pubescent beneath .....                                  | <i>P. americana</i> var. <i>lanata</i>    |



*Malus coronaria*



*Malus pumila*



*Neviusia alabamensis*



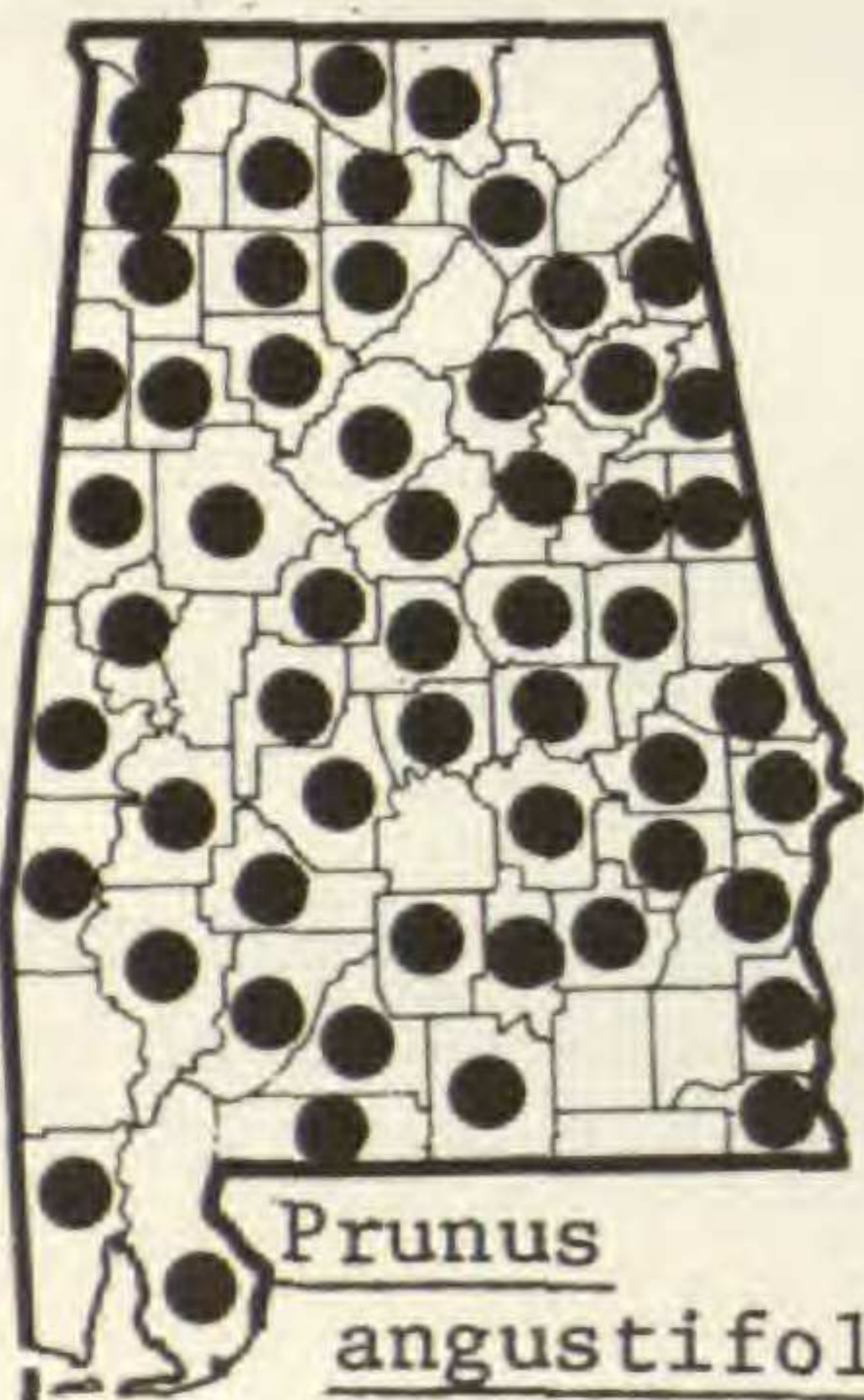
*Physocarpus opulifolius*



*Prunus americana* var. *americana*



*Prunus americana* var. *lanata*



*Prunus angustifolia*



*Prunus caroliniana*



*Prunus hortulana*



*P. americana* Marshall var. *americana*. Thickets, trash piles, deciduous woods; throughout.

*P. americana* Marshall var. *lanata* Sudworth. Thickets, trash piles, deciduous woods; throughout. *P. lanata* (Sudw.) Mackz. & Bush.—H; *P. mexicana* Watson—S.

2. *P. angustifolia* Marshall, CHICKSAW PLUM. Spring; late spring—early summer. Thickets (often of its own making), rights-of-way, woodland borders; throughout.

3. *P. caroliniana* Aiton, LAUREL CHERRY. Spring; fall. Fencerows, low woods, native and escaped from cultivation; CP, P, HR. *Laurocerasus caroliniana* (Mill.) Roem.—S.

4. *P. persica* (L.) Batsch., PEACH. Spring; summer. Fencerows, rights-of-way, trash heaps, woods borders; escaped throughout. *Amygdalus persica* L.—S.

5. *P. serotina* Ehrhart, BLACK CHERRY, WILD CHERRY. Spring; summer.

1. Leaves glabrous beneath, except often more or less pubescent near the veins; rachis of inflorescence glabrous ..... *P. serotina* subsp. *serotina*

1. Leaves pubescent beneath over the entire blade; rachis of inflorescence pubescent ..... *P. serotina* subsp. *hirsuta*

*P. serotina* Ehrhart subsp. *serotina*. Woods, fencerows, fields; throughout. *P. serotina neo-montana* (Sm.) Sudw.—M; *Padus virginiana* (L.) Mill.—S.

*P. serotina* Ehrhart subsp. *hirsuta* (Elliott) McVaugh. Rocky woods, infrequent; CP, AM, southern CuP, VR. *P. serotina* var. *alabamensis* (Mohr) Little—RAB; *P. alabamensis* Mohr—M, H; *P. australis* Bead.—H; *Padus alabamensis* (Mohr) Sm., *Padus australis* Bead.—S.

6. *P. umbellata* Elliott, HOG PLUM, SLOE PLUM. Spring; summer. Upland thickets, woodland borders; throughout, but more common southeastward. *P. injucunda* Sm.—M, S; *P. mitis* Bead.—S.

*Prunus hortulana* Bailey has been reported (as a waif?) from Mobile County. *Prunus gracilis* Engelm. & Gray cited by Mohr (1901) is of uncertain status.

#### 8. *Pyracantha* Roemer, FIRETHORN

1. *P. coccinea* Roemer. Spring—summer; fall—winter. Fencerows, rights-of-way, infrequently escaped; CP. *Cotoneaster pyracantha* (L.) Spach—M, S.

#### 9. *Pyrus* L., PEAR

1. *P. communis* L. Spring; summer—fall. Occasionally escaped; throughout.

#### 10. *Rosa* L., ROSE

- |   |                         |
|---|-------------------------|
| 1. Leaf rachises stipitate-glandular .....  | 2                       |
| 2. Stipules pectinate .....   | 3                       |
| 3. Leaflets glandular over the lower surfaces .....   | 3. <i>R. eglanteria</i> |
| 3. Leaflets glandular beneath only along the midrib, or not at all .....                        | 4                       |
| 4. Stipules free from petiole for more than ½ their lengths; sepals 1.5 cm long or longer ..... | 1. <i>R. bracteata</i>  |
| 4. Stipules adnate to petiole for more than ½ their lengths; sepals 1 cm long or shorter .....  | 5                       |



Prunus persica



Prunus serotina  
ssp. serotina



Prunus serotina  
ssp. hirsuta



Prunus umbellata



Pyracantha  
coccinea



Pyrus communis



Rosa bracteata



Rosa canina



Rosa carolina

5. Leaflets tomentose beneath ..... 5. *R. multiflora*  
 5. Leaflets glabrous beneath, or pubescent only near the midvein ..... 8. *R. wichuraiana*
2. Stipules entire or with glandular margins, not pectinate ..... 6  
 6. Leaflets glandular over the lower surfaces ..... 3. *R. eglantheria*  
 6. Leaflets glandular beneath only along the midrib, or not at all, except sometimes marginally ..... 7  
 7. Flowers and fruits solitary ..... 2. *R. carolina*  
 7. Flowers and fruits 2 or more in an inflorescence ..... 7. *R. setigera*
1. Leaf rachises not stipitate-glandular ..... 8  
 8. Stipules pectinate ..... 5. *R. multiflora*  
 8. Stipules entire or with glandular margins, not pectinate ..... 9  
 9. Stipules adnate to petiole for less than  $\frac{1}{2}$  their lengths ..... 4. *R. laevigata*  
 9. Stipules adnate to petiole for more than  $\frac{1}{2}$  their lengths ..... 10  
 10. Infrastipular spines retrorsely arching ..... 6. *R. palustris*  
 10. Infrastipular spines straight ..... 2. *R. carolina*

1. *R. bracteata* Wendland, MACARTNEY R. Spring-fall; summer-fall. Fence-rows, waste places, old homesites, persistent after or rarely spreading from cultivation, occasional; throughout.

2. *R. carolina* L., WILD R. Spring-early summer; summer-fall. Upland woods, thickets, fencerows; throughout. *R. humilis* Marsh.—H, M.

3. *R. eglantheria* L., EGLANTINE SWEETBRIAR R. Spring-summer; fall. Waste places, infrequent; P, AM, CuP. *R. rubiginosa* L.—M, S.

4. *R. laevigata* Michaux, CHEROKEE R. Spring; fall. Reported as naturalized; CP.

5. *R. multiflora* Thunberg, MULTIFLORA R. Spring; summer-fall. Fencerows, waste places, naturalized; throughout.

6. *R. palustris* Marshall, SWAMP R. Spring-summer; fall. Low ground, rare, CP, VR. *R. virginiana* Mill.—S.

7. *R. setigera* Michaux, PRAIRIE R. Spring; fall. Thickets, rights-of-way, infrequent; inner CP, CuP, VR, HR. *R. rubifolia* Brown—S.

8. *R. wichuraiana* Crepin. Spring; fall. Roadsides, old homesites, waste places, persistent or spreading; throughout.

*Rosa canina* L. (DOG R.) and *R. moschata* Herrm. (MUSK R.) have been reported as persistent or rarely spreading.

### 11. *Rubus* L.

1. Leaves simple ..... 8. *R. odoratus*  
 1. Leaves compound ..... 2  
 2. Petals shorter than the sepals; fruit separating from torus at maturity ..... 7. *R. occidentalis*
2. Petals longer than the sepals; fruit adhering tightly to torus at maturity ..... 3  
 3. Leaves white- or gray-tomentose beneath ..... 4. *R. cuneifolius*  
 3. Leaves not white- or gray-tomentose beneath ..... 4  
 4. Stems trailing ..... 5  
 5. Flowers and fruits solitary ..... 6  
 6. Stems hispid, or pedicels evenly retrorsely-spiny; leaves semi-evergreen ..... 9. *R. trivalis*
6. Stems not hispid; pedicels pubescent to remotely retrorsely-spiny; leaves deciduous ..... 5. *R. flagellaris*  
 5. Flowers and fruits commonly 3 or more per inflorescence ..... 7  
 7. Stems hispid, at least remotely so ..... 6. *R. hispidus*



Rosa eglantheria



Rosa laevigata



Rosa moschata



Rosa multiflora



Rosa palustris



Rosa setigera



Rosa wichuraiana



Rubus allegheniensis



Rubus argutus

- |  |                             |
|--|-----------------------------|
| 7. Stems retrorsely spiny, not hispid .....                                    | 5. <i>R. flagellaris</i>    |
| 4. Stems erect or arching .....  | 8                           |
| 8. Pedicels stipitate-glandular .....  | 1. <i>R. allegheniensis</i> |
| 8. Pedicels not stipitate-glandular .....                                      | 9                           |
| 9. Leaves glabrous or glabrate beneath, except along the principal veins ..... | 3. <i>R. betulifolius</i>   |
| 9. Leaves velvety-pubescent over the lower surfaces .....                      | 2. <i>R. argutus</i>        |

1. *R. allegheniensis* Porter, BLACKBERRY. Spring; late spring-early summer. Opening, rare; AM. *R. nigrobaccus* Bail.—S.

2. *R. argutus* Link, BLACKBERRY. Spring; late spring-early summer. Fields, openings in woods, fencerows, roadsides, thickets; throughout, but becoming infrequent southward. *R. argutus floridus* (Tratt.) Bail.—M; *R. floridus* Tratt.—H, S.

3. *R. betulifolius* Small, BLACKBERRY. Spring; late spring-early summer. Thickets, fencerows, roadsides, infrequent; CP.

4. *R. cuneifolius* Pursh, BLACKBERRY. Spring; late spring-summer. Fields, roadsides, fencerows; throughout, but more common southeastward.

5. *R. flagellaris* Willd., DEWBERRY. Spring; spring-early summer. Fields, rights-of-way, upland woods; throughout, but more common northeastward. *R. enslenii* Tratt., *R. invisus* (Bail.) Britt.—M, S; *R. rhodophyllus* Rydb., *R. baileyanus* Britt.—S.

6. *R. hispidus* L., DEWBERRY. Low woods, rare; CP, reported from P, CuP, *R. continentalis* (Focke) Bail.—S.

7. *R. occidentalis* L., RASPBERRY. Mesic or rich woods, rare; CuP, VR, HR.

8. *R. odoratus* L. Late spring-early summer; summer. Rocky woods, rare; reported from CuP (Jackson Co.) by Dean (1961). *Rubacer odoratum* (L.) Rydb.—S.—This species is so distinctive that the report of its occurrence should justify its inclusion here.

9. *R. trivialis* Michaux, DEWBERRY. Spring. Roadsides, rights-of-way, open low ground; CP, P, AM, CuP. *R. lucidus* Rydb.—S.

## 12. *Sorbus* L.

1. *S. arbutifolia* (L.) Heynhold. Spring; late summer-fall. Swamp ecotones, low woods, seepages; CP, P, AM, CuP. *Aronia arbutifolia* (L.) Ell.—M, S; *A. arbutifolia* (L.) Pers.—H; *S. arbutifolia* var. *atropurpurea* (Britt.) Schneid.—RAB. Two color forms of the mature fruit exist: Red and bluish-black.

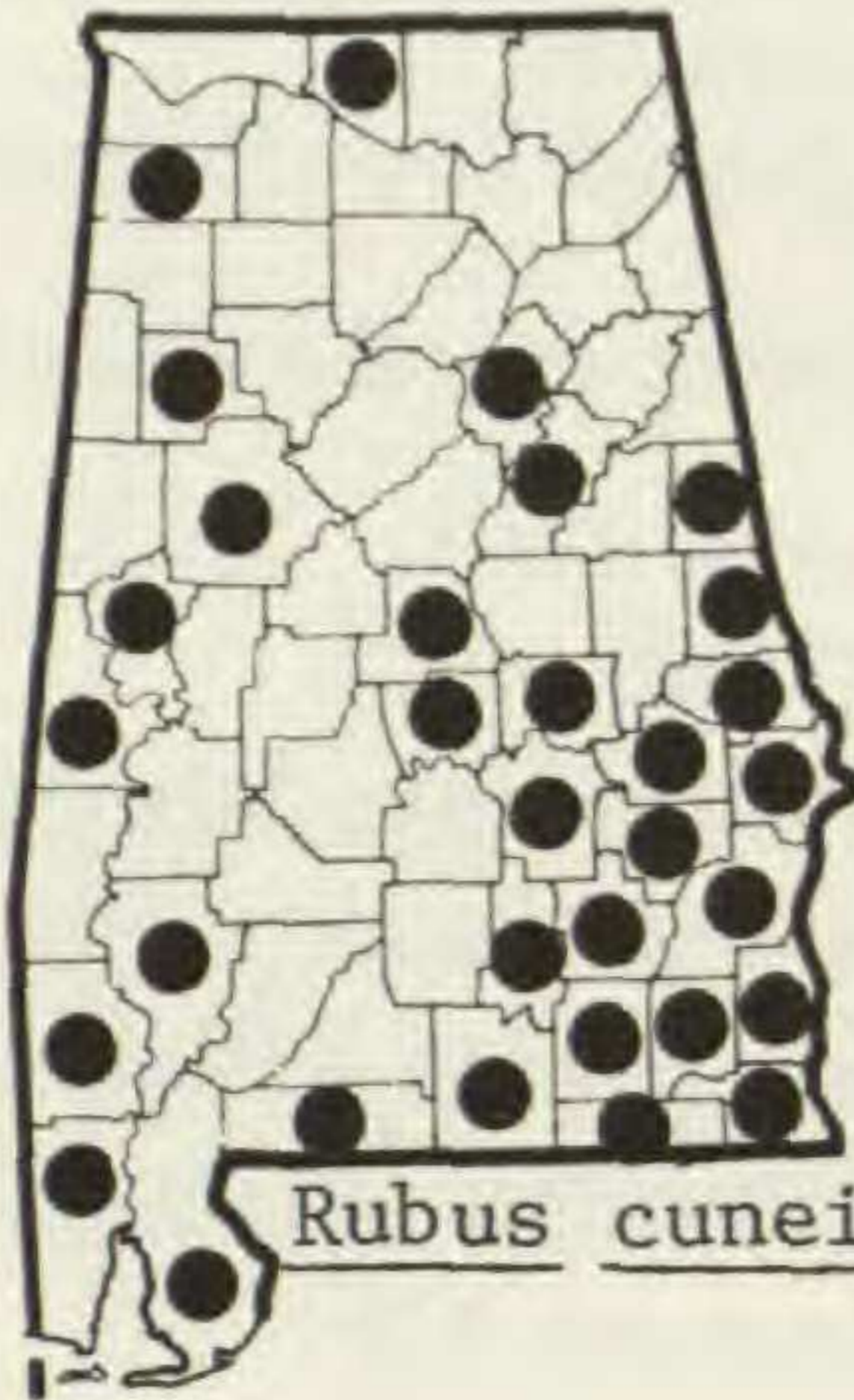
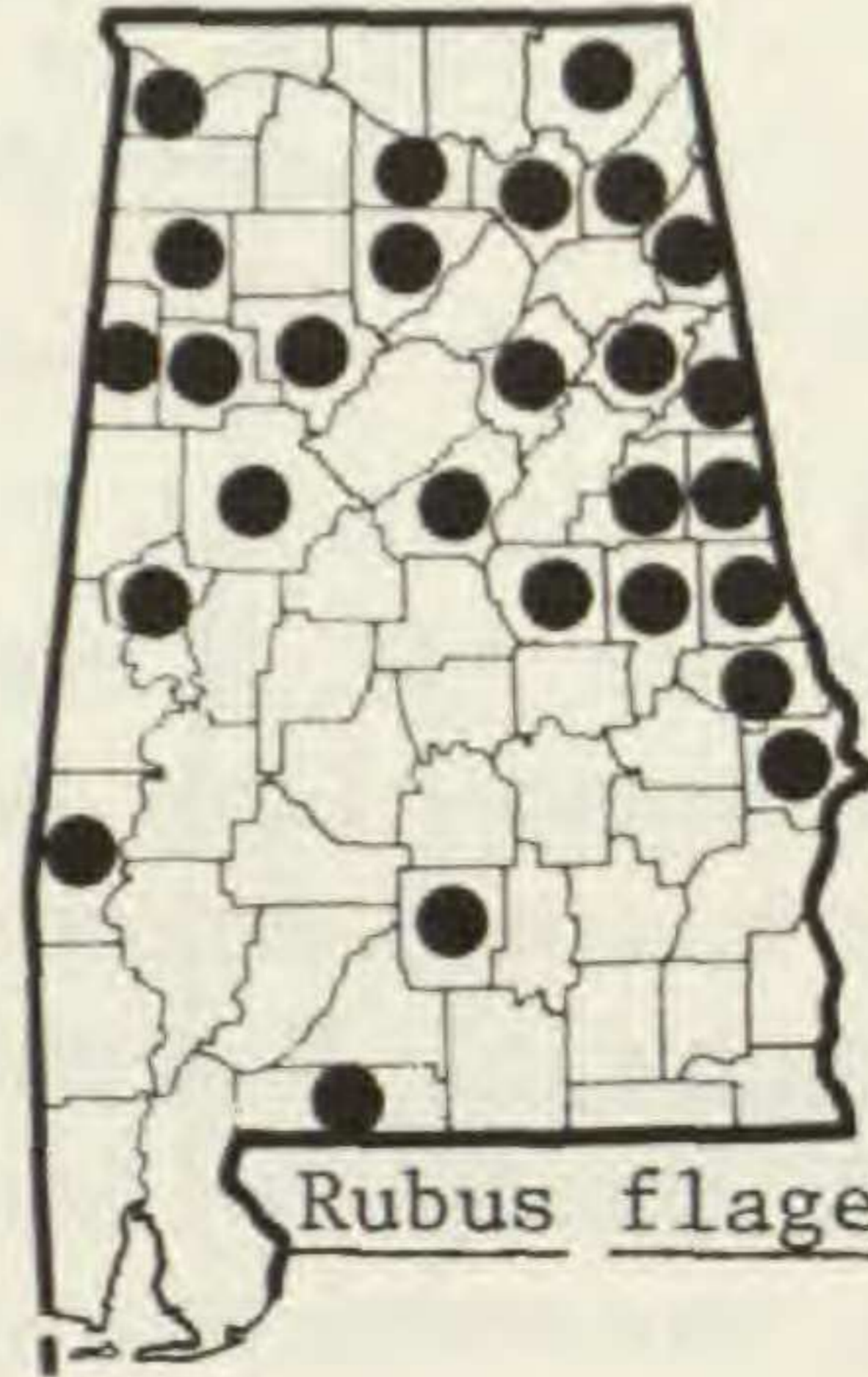
## 13. *Spiraea* L., SPIRAEA

- |   |                           |
|---|---------------------------|
| 1. Inflorescence pedunculate .....                                  | 3. <i>S. tomentosa</i>    |
| 1. Inflorescences not pedunculate .....                             | 2                         |
| 2. Flowers in umbel-like racemes on current season's growth .....   | 1. <i>S. cantoniensis</i> |
| 2. Flowers in sessile umbels on last season's or older growth ..... | 2. <i>S. thunbergii</i>   |

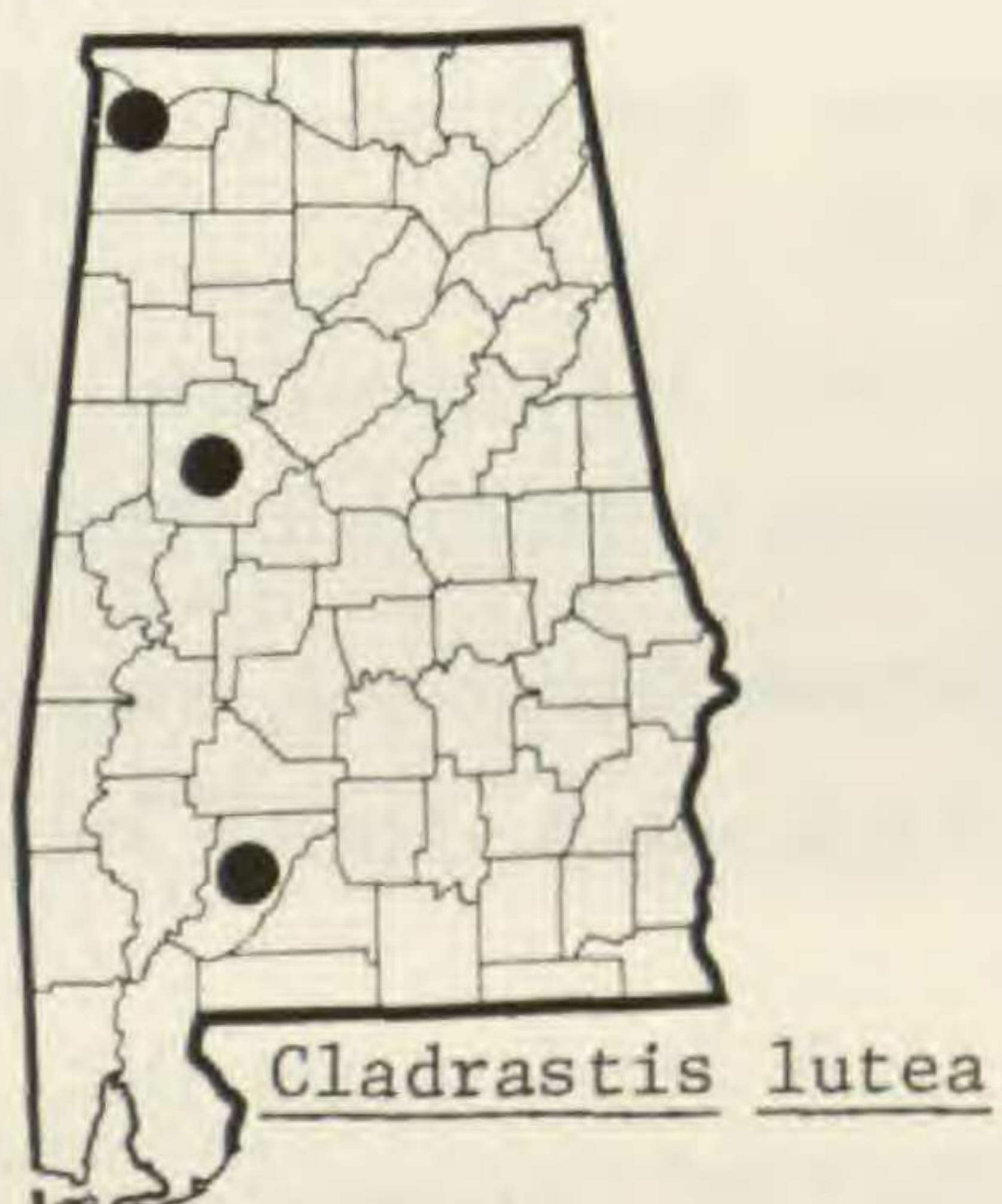
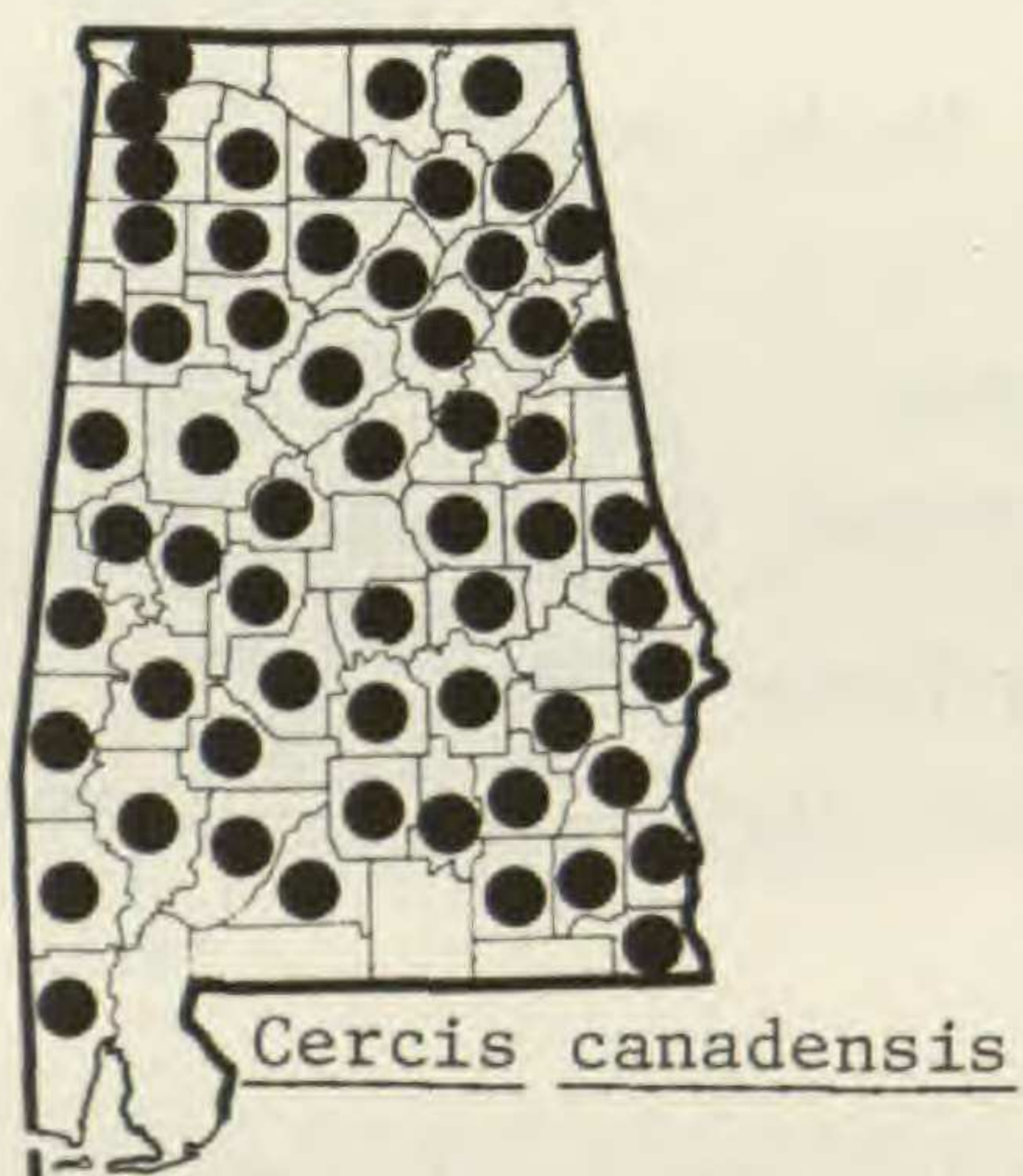
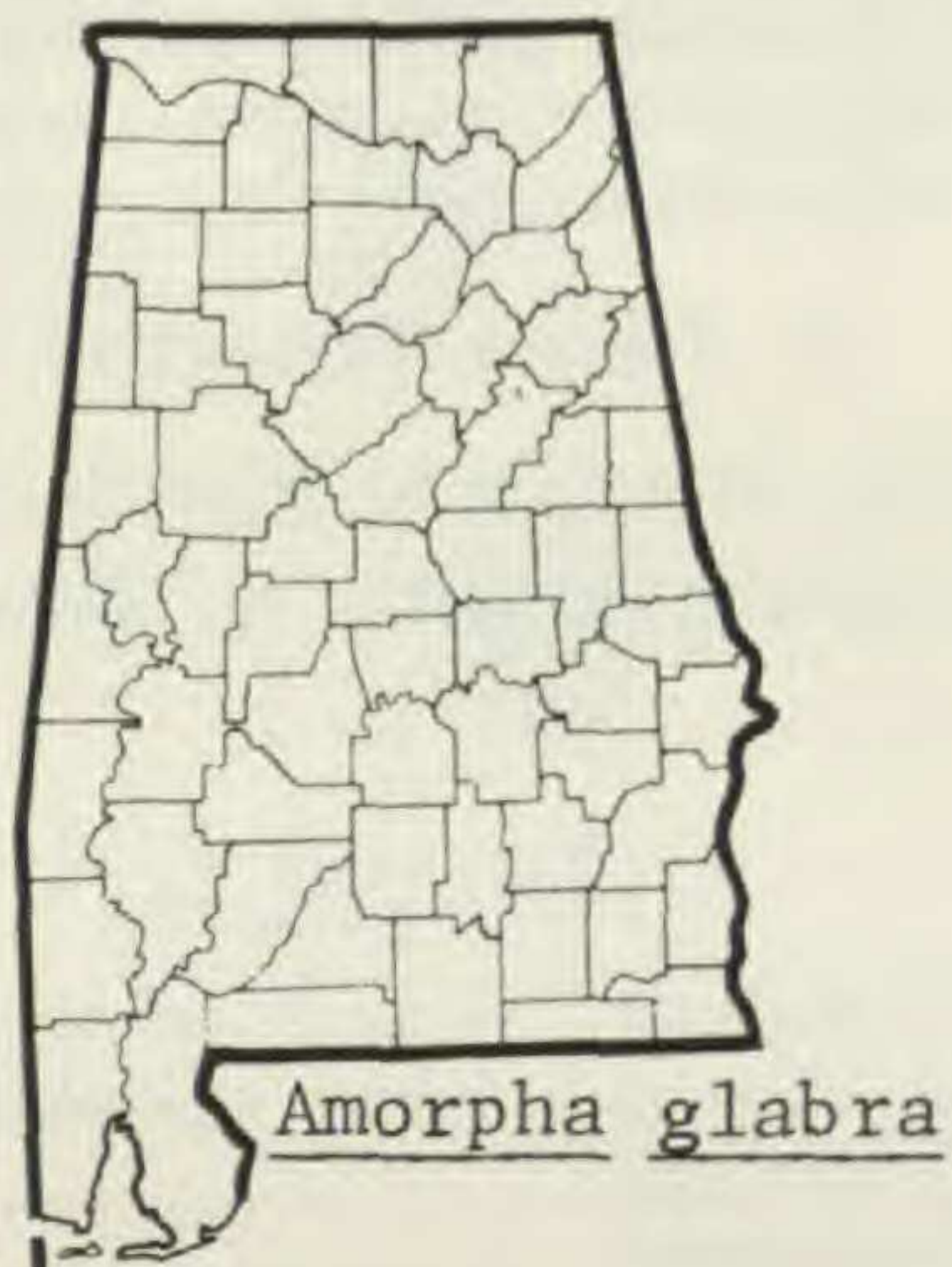
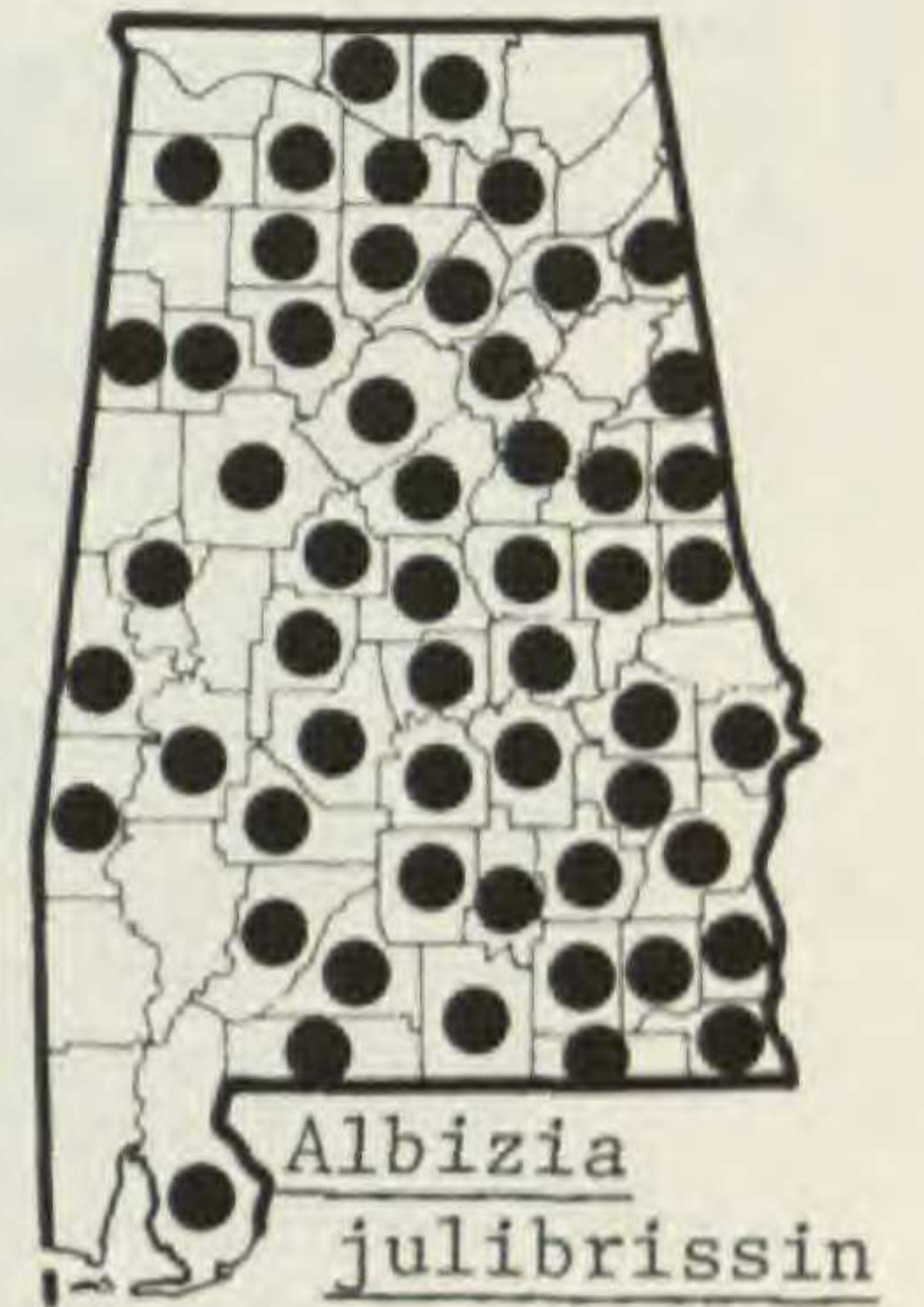
1. *S. cantoniensis* Loureiro. Flowers, fruit not seen in Alabama. Escaped to roadside; VR.

2. *S. thunbergii* Siebold. Spring; fruit not seen in Alabama. Escaped to roadsides; southeastern CP, CuP (rare).

3. *S. tomentosa* L. Summer; fall. Habitat not specified, very rare; HR.

Rubus betulifoliusRubus cuneifoliusRubus flagellarisRubus hispidusRubus occidentalisRubus odoratusRubus trivialisSorbus arbutifoliaSpiraea cantoniensis

30. FABACEAE



## 30. FABACEAE

1. Leaves simple .....	3. <i>Cercis</i>
1. Leaves compound .....	2
2. Leaves decomposed .....	3
3. Inflorescence capitate; stamens more than 10, united .....	4
4. Stipular thorns present .....	12. <i>Vachellia</i>
4. Stipular thorns absent .....	1. <i>Albizia</i>
3. Inflorescence racemose or paniculate; stamens 10, free .....	5
5. Leaflet margins crenulate; seed less than 0.5 cm thick .....	6. <i>Gleditsia</i>
5. Leaflet margins entire; seed more than 1 cm thick .....	7. <i>Gymnocladus</i>
2. Leaves once compound .....	6
6. Leaf rachises winged .....	9. <i>Parkinsonia</i>
6. Leaf rachises not winged .....	7
7. Plant a trailing or twining vine .....	8
8. Leaves 3-foliolate .....	10. <i>Pueraria</i>
8. Leaves, at least most, 5- or more-foliolate .....	13. <i>Wisteria</i>
7. Plant a shrub or tree .....	9
9. Leaves 3-foliolate .....	8. <i>Lespedeza</i>
9. Leaves predominantly 5- or more-foliolate .....	10
10. Leaves even-pinnately compound; fruit 4-winged .....	5. <i>Daubentonia</i>
10. Leaves odd-pinnately compound; fruit wingless .....	11
11. Petal 1; calyces and fruit glandular-punctate .....	2. <i>Amorpha</i>
11. Petals 5; calyces and fruit not glandular-punctate .....	12
12. Inflorescence racemose; stamens monadelphous .....	11. <i>Robinia</i>
12. Inflorescence paniculate; stamens distinct .....	4. <i>Cladrastis</i>

1. *Albizia* Durazzini.

1. *A. julibrissin* Durazzini, SILK TREE, MIMOSA. Late spring–summer; summer–fall. Commonly naturalized, usually in fencerows, rights-of-way, mesic woods; throughout.

2. *Amorpha* L.

1. Calyx lobes, at least some, 1.5 mm long or longer; calyx pilose .....	3. <i>A. schwerini</i>
1. Calyx lobes 1 mm or less long; calyx puberulent, strigillose or glabrous .....	2
2. Calyx lobes more than 0.5 mm long .....	1. <i>A. fruticosa</i>
2. Calyx lobes less than 0.5 mm long .....	2. <i>A. glabra</i>

1. *A. fruticosa* L. Spring–early summer; summer–fall. Stream-banks, open woods; throughout. *A. tennesseensis* Shuttlw.—S.

2. *A. glabra* Poiret. Spring–early summer; summer–fall. Reported by Mohr (1901) and later writers.

3. *A. schwerini* Schneider. Spring; summer–fall. Rocky woods, local; AM. *A. virgata* Sm. in part?—M, H.

3. *Cercis* L., JUDAS-TREE, REDBUD

1. *C. canadensis* L. Spring; summer–fall. Mesic woods; throughout.

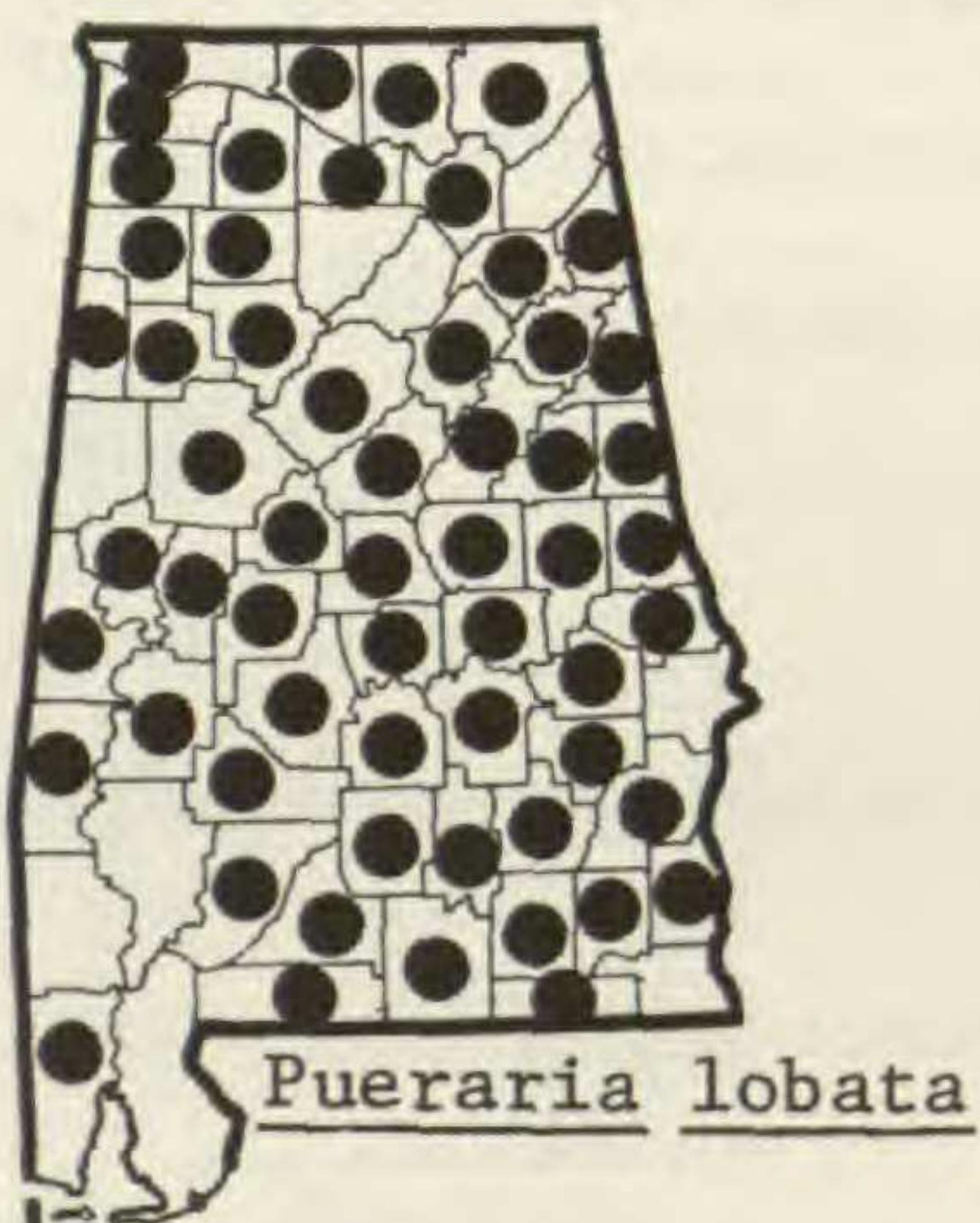
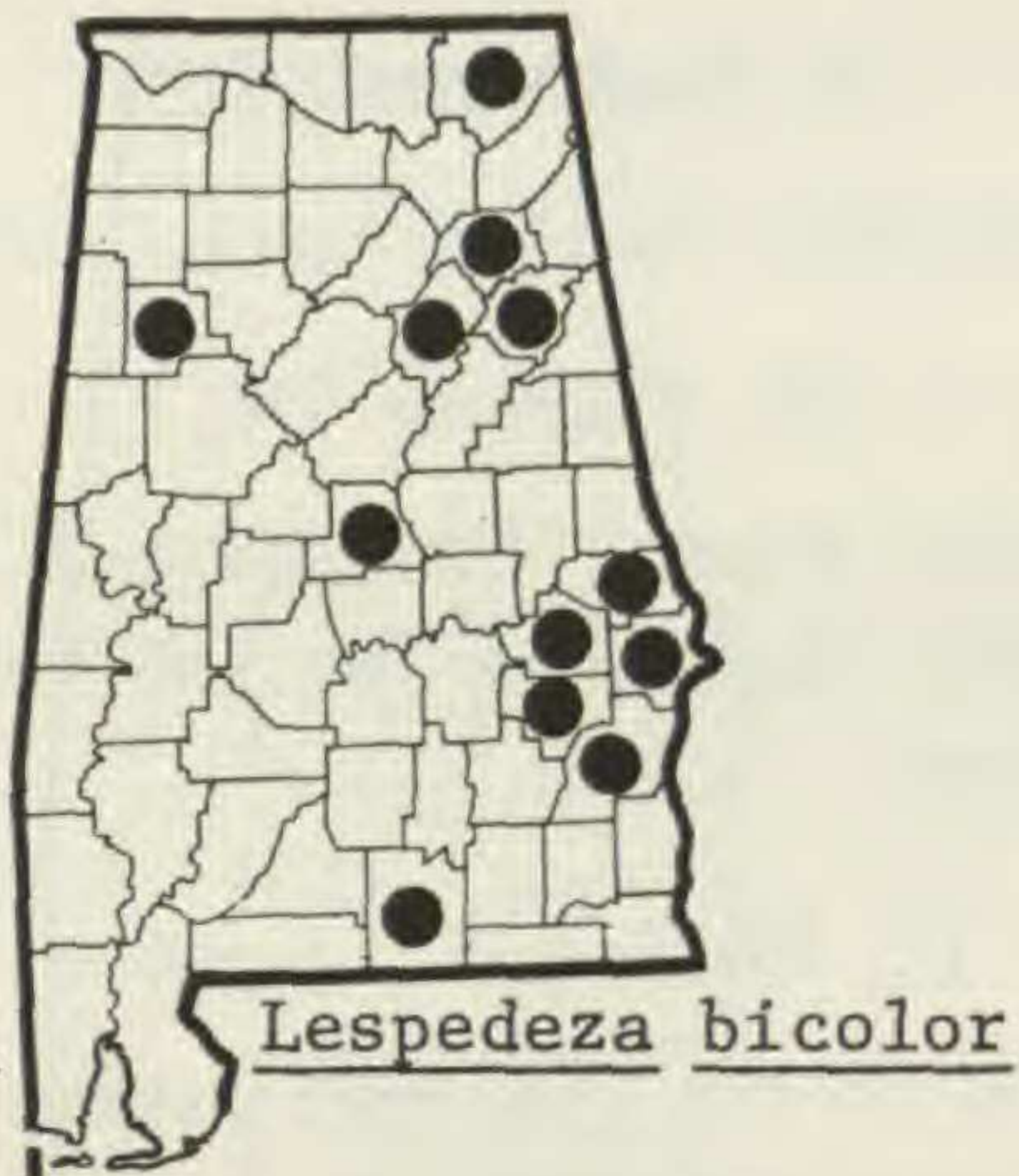
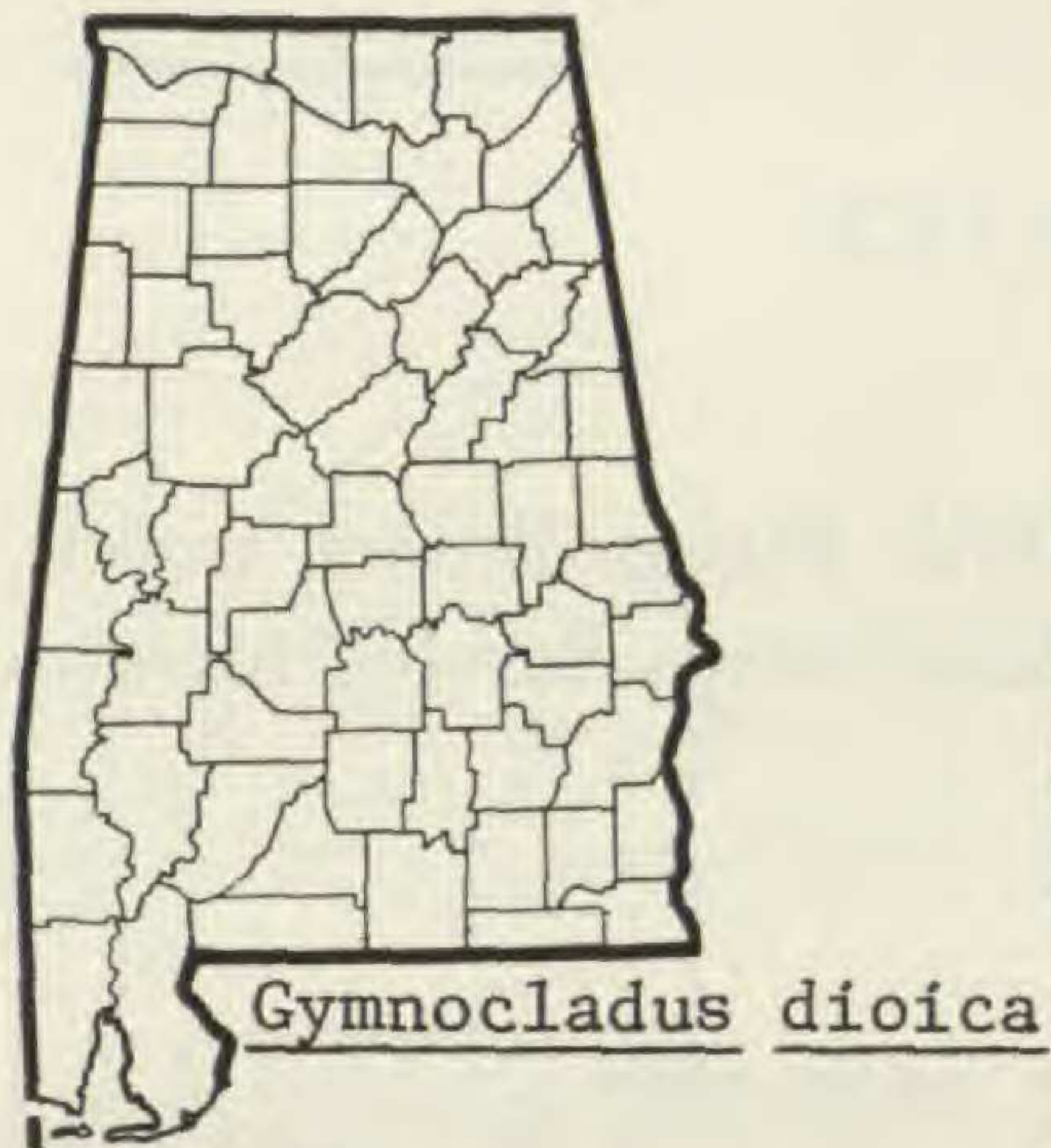
4. *Cladrastis* Rafinesque, YELLOW-WOOD

1. *C. lutea* (Michaux f.) K. Koch. Spring; summer. Rich woods, rare; CP, CuP, HR.

5. *Daubentonia* DC.

1. *D. punicea* (Cavanilles) DC. Summer; summer–fall. Ditches, low ground; OCP.





6. *Gleditsia* L.

1. *G. triacanthos* L., HONEY LOCUST. Spring; summer-fall. Low and upland woods, thickets, fencerows; throughout, but more common eastward and infrequent in southern CP.

*Gleditsia aquatica* Marshall (WATER LOCUST) has been reported by Wilbur in Radford, Ahles and Bell (1968), but no specimens have been seen by the writer.

7. *Gymnocladus* Lamarck, KENTUCKY COFFEE-TREE

1. *G. dioica* (L.) K. Koch. Spring; summer-winter. Persistent and weakly spreading from root or stump sprouts, rare; CuP, HR. No native individuals have been discovered.

8. *Lespedeza* Turzc.

1. *L. bicolor* Turzc. Summer; summer-fall. Roadsides, fencerows, rights-of-way, becoming naturalized from plantings, infrequent; CP, P, AM, CuP, VR.

9. *Parkinsonia* L.

1. *P. aculeata* L. Summer; fall. Waste ground, rare; OCP.

10. *Pueraria* DC.

1. *P. lobata* (Willd.) Ohwi, KUDZU. Summer-fall; fall. Rights-of-way, woods, fields; throughout.—Originally planted by the Soil Conservation Service for erosion control; now a serious pest.

11. *Robinia* L., LOCUST

- |   |                            |
|---|----------------------------|
| 1. Lower 3 calyx lobes less than 2.5 mm long; fruit glabrous; petals white .....                              | 5. <i>R. pseudo-acacia</i> |
| 1. Lower 3 calyx lobes more than 2.5 mm long; fruit hispid; petals purplish to pink, rarely white .....       | 2                          |
| 2. Bracts more than 3 mm wide, longer than calyx; glandular pubescence of branches stout .....                | 3                          |
| 3. Branches and peduncles with sessile or subsessile, viscid glands .....                                     | 6. <i>R. viscosa</i>       |
| 3. Branches and peduncles with stout, short-stalked glands .....  | 3. <i>R. hartwigii</i>     |
| 2. Bracts less than 2 mm wide, equal to or shorter than calyx; glandular pubescence of branches slender ..... | 4                          |
| 4. Indurate trichomes more than 3 mm long present on last season's growth .....                               | 4. <i>R. hispida</i>       |
| 4. Indurate trichomes absent on last season's growth .....  | 5                          |
| 5. Pedicels glandular-hispid .....  | 1. <i>R. boyntonii</i>     |
| 5. Pedicels not glandular-hispid .....  | 2. <i>R. elliotii</i>      |

1. *R. boyntonii* Ashe. Spring; fruit not seen. Rocky woods, rare, reported from CuP by Wilbur in Radford, Ahles and Bell (1968).

2. *R. elliotii* (Chapman) Ashe ex Small. Spring; summer-fall. Open woods, rare; CuP.

3. *R. hartwigii* Koehne. Spring; summer-fall. Rocky woods, infrequent, and occasionally persistent or escaping from cultivation; AM, CuP.

4. *R. hispida* L. Spring; summer-fall. Rocky woods, infrequent; P, AM, CuP, VR. *R. grandiflora* Ashe—S.



Robinia hartwigii



Robinia hispida



Robinia pseudo-acacia



Robinia viscosa



Vachellia farnesiana



Wisteria floribunda

31. RUTACEAE



Wisteria frutescens



Wisteria sinensis



Poncirus trifoliata

5. *R. pseudo-acacia* L., BLACK L. Spring; summer-fall. Deciduous woods, and spreading from cultivation into various habitats; throughout.

6. *R. viscosa* Vent. Spring; summer-fall. Reported by several writers, including Wilbur in Radford, Ahles and Bell (1968); no specimens seen by the writer.

### 12. *Vachellia* Wight & Arnott

1. *V. farnesiana* (L.) Wight & Arnott. Winter-spring. Waste ground, rare; OCP.

### 13. *Wisteria* Nuttall, WISTERIA

- |   |                         |
|---|-------------------------|
| 1. Ovary and fruit glabrous .....                     | 2. <i>W. frutescens</i> |
| 1. Ovary and fruit densely pubescent .....            | 2                       |
| 2. Leaflets 7-13; flowers more than 2 cm long .....   | 3. <i>W. sinensis</i>   |
| 2. Leaflets 13-19; flowers 2 cm long or shorter ..... | 1. <i>W. floribunda</i> |

1. *W. floribunda* (Willd.) DC. Spring-summer; summer-fall. Reported by Wilbur in Radford, Ahles and Bell (1968). *Kraunhia floribunda* (Willd.) Taub.—S.

2. *W. frutescens* (L.) Poiret. Spring; spring-fall. Low forest margins, thickets, infrequent; CP, AM, HR. *Kraunhia frutescens* (L.) Britt.—S; *K. frutescens* (L.) Greene—M.

3. *W. sinensis* (Sims) Sweet. Spring; summer-fall. Frequent escape to rights-of-way, open ground; throughout.

*Cytisus scoparius* (L.) Link (SCOTCH BROOM) has been cited as an escape in Alabama by Wilbur in Radford, Ahles and Bell (1968), but the present writer is unable to verify this.

## 31. RUTACEAE

- |  |                       |
|--|-----------------------|
| 1. Leaves 3-foliolate; leaflets entire .....                                   | 2                     |
| 2. Stem with thorns; petioles winged; fruit a berry .....                      | 1. <i>Poncirus</i>    |
| 2. Stem thornless; petioles wingless; fruit a samara .....                     | 2. <i>Ptelea</i>      |
| 1. Leaves, at least most, 5- or more-foliolate; leaflets cuneate-serrate ..... | 3. <i>Zanthoxylum</i> |

### 1. *Poncirus* Rafinesque, TRIFOLIATE ORANGE

1. *P. trifoliata* (L.) Rafinesque. Spring; fall. Escaped to alluvial woods, rare; CP, P, VR.

### 2. *Ptelea* L., WAFER-ASH

1. *P. trifoliata* L. Spring; summer. Dry or alluvial woods, infrequent; CP, CuP, VR. *P. microcarpa* Sm.—S.

### 3. *Zanthoxylum* L., PRICKLY ASH, TOOTHACHE TREE

- |  |                             |
|--|-----------------------------|
| 1. Inflorescences axillary; leaflets pubescent beneath ..... | 1. <i>Z. americana</i>      |
| 1. Inflorescence terminal; leaflets glabrous beneath .....   | 2. <i>Z. clava-herculis</i> |

1. *Z. americana* Miller. Spring; summer. Rich, alluvial woods, very rare; CP, southern CuP.



Ptelea trifoliata



Zanthoxylum americana



Zanthoxylum clava-herculis

32. SIMAROUBACEAE



Ailanthus altissima

33. MELIACEAE



Melia azedarach

34. EUPHORBIACEAE



Aleurites fordii



Andrachne phyllanthoides



Croton alabamensis



Sapium sebiferum

2. *Z. clava-herculis* L. Spring; summer-fall. Thickets, alluvial woods, rare; CP, HR.

### 32. SIMAROUBACEAE

#### 1. *Ailanthus* Desf., TREE OF HEAVEN

1. *A. altissima* (Miller) Swingle. Spring; summer-fall. Mesic woods, rights-of-way, waste places; throughout. *A. glandulosa* Desf.—M.

### 33. MELIACEAE

#### 1. *Melia* L., CHINA-BERRY

1. *M. azedarach* L. Spring; late summer-winter. Fencerows, roadsides, waste places; throughout.

### 34. EUPHORBIACEAE

- |  |                       |
|--|-----------------------|
| 1. Leaves serrate .....  | 6. <i>Stillingia</i>  |
| 1. Leaves entire .....   | 2                     |
| 2. Twigs, inflorescences and lower surfaces of leaves covered with silvery, peltate scales ..... | 3. <i>Croton</i>      |
| 2. Twigs, inflorescences and lower surfaces of leaves lacking peltate scales, not silvery ..     | 3                     |
| 3. Leaves cordate .....  | 1. <i>Aleurites</i>   |
| 3. Leaves truncate to cuneate .....  | 4                     |
| 4. Inflorescences terminal .....   | 5                     |
| 5. Petioles 1 cm or less long; leaves lanceolate to elliptic .....                               | 5. <i>Sebastiania</i> |
| 5. Petioles more than 2 cm long; leaves rhombic .....  | 4. <i>Sapium</i>      |
| 4. Inflorescences of axillary-solitary flowers .....   | 2. <i>Andrachne</i>   |

#### 1. *Aleurites* Forst.

1. *A. fordii* Hemsl., TUNG OIL TREE. Flowers not seen; summer. Fencerows, rights-of-way, rare; OCP.

#### 2. *Andrachne* L.

1. *A. phyllanthoides* (Nuttall) Mueller. Summer-fall. Sand bar, extremely rare; CuP.—This is the only population of this plant known from east of Arkansas (Clark, 1967).

#### 3. *Croton* L.

1. *C. alabamensis* Smith. Spring. Rocky slopes, rare and local; southern CuP.—A single population of this species in southern Tennessee is the only known population outside Alabama.

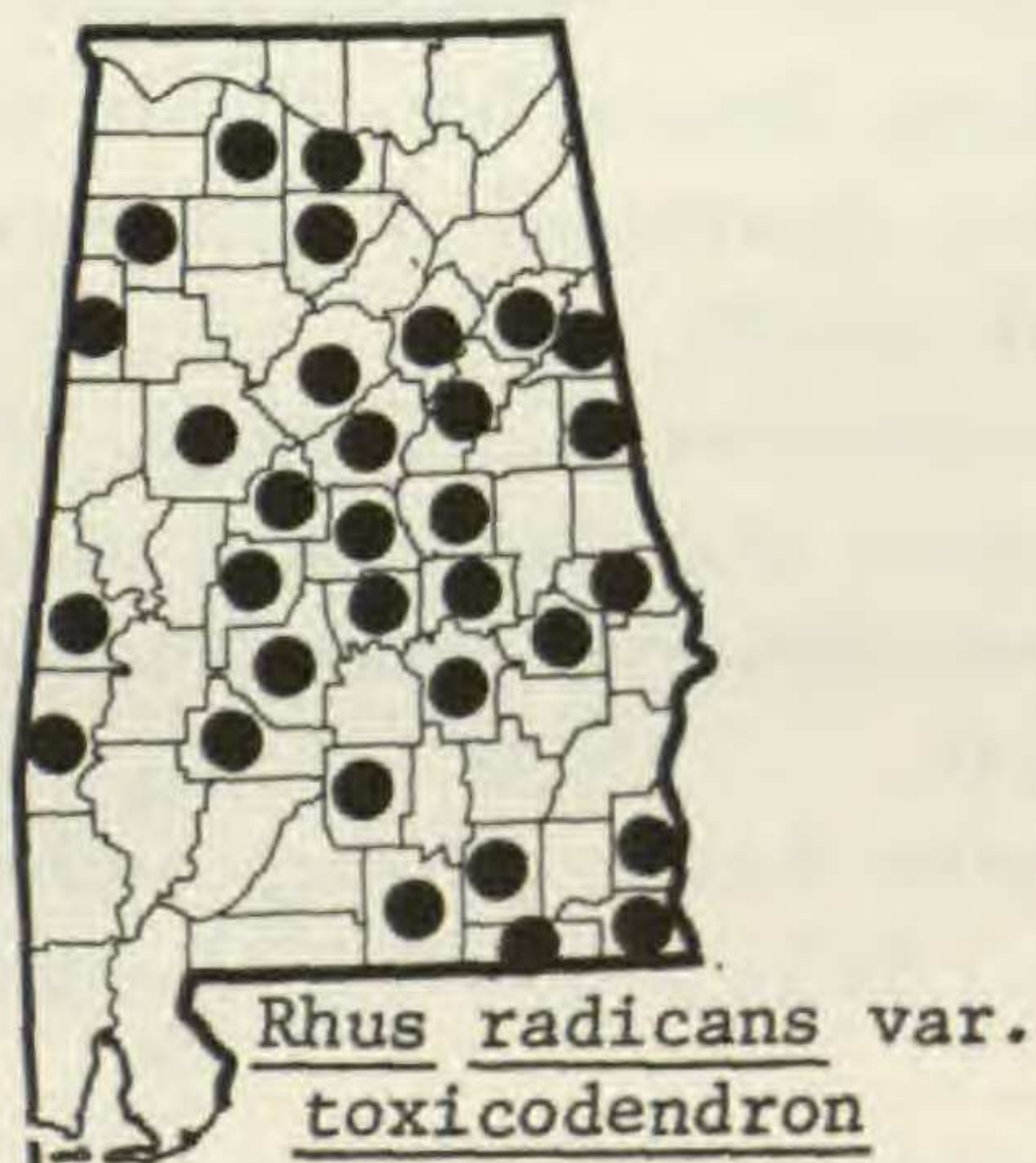
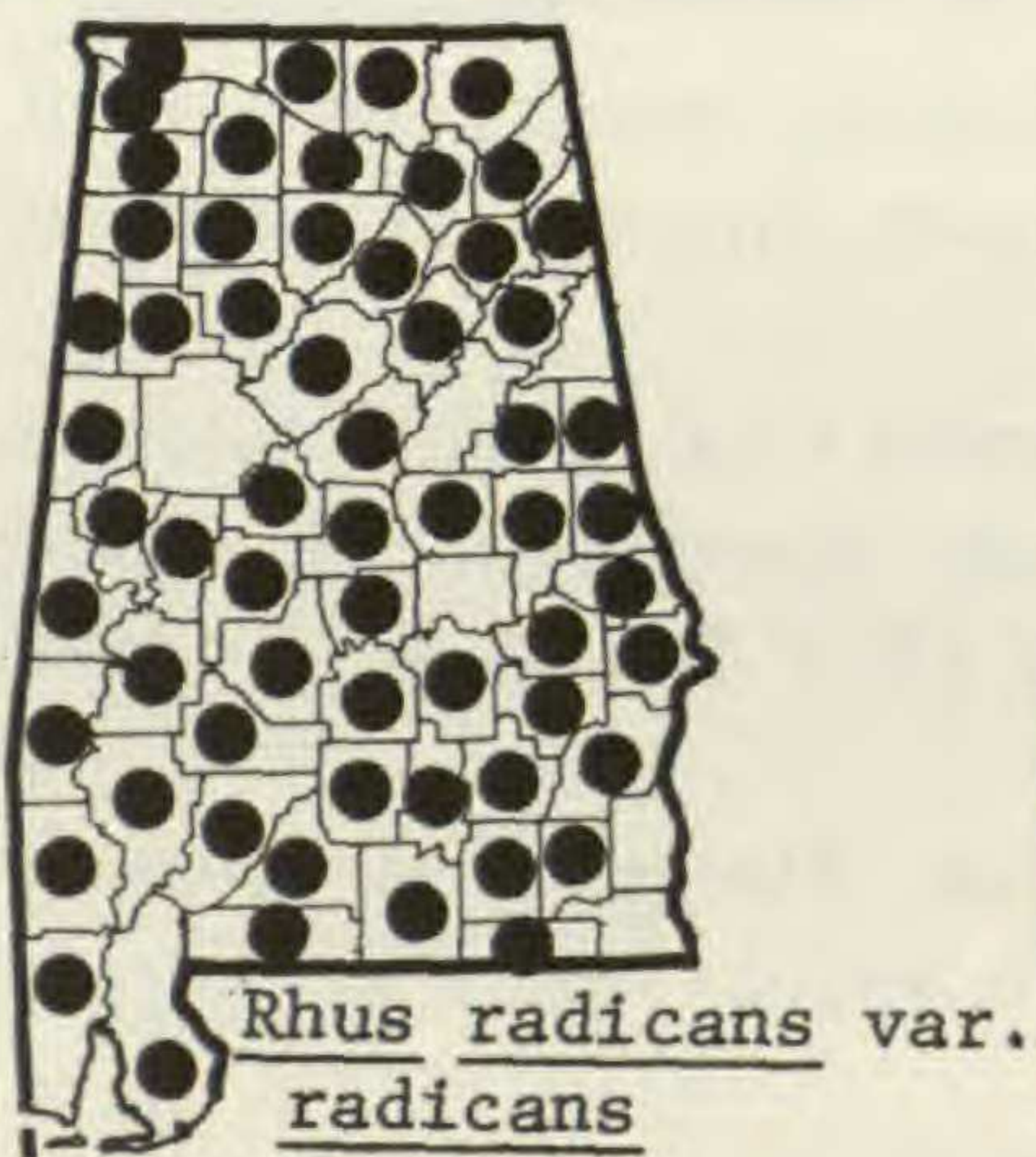
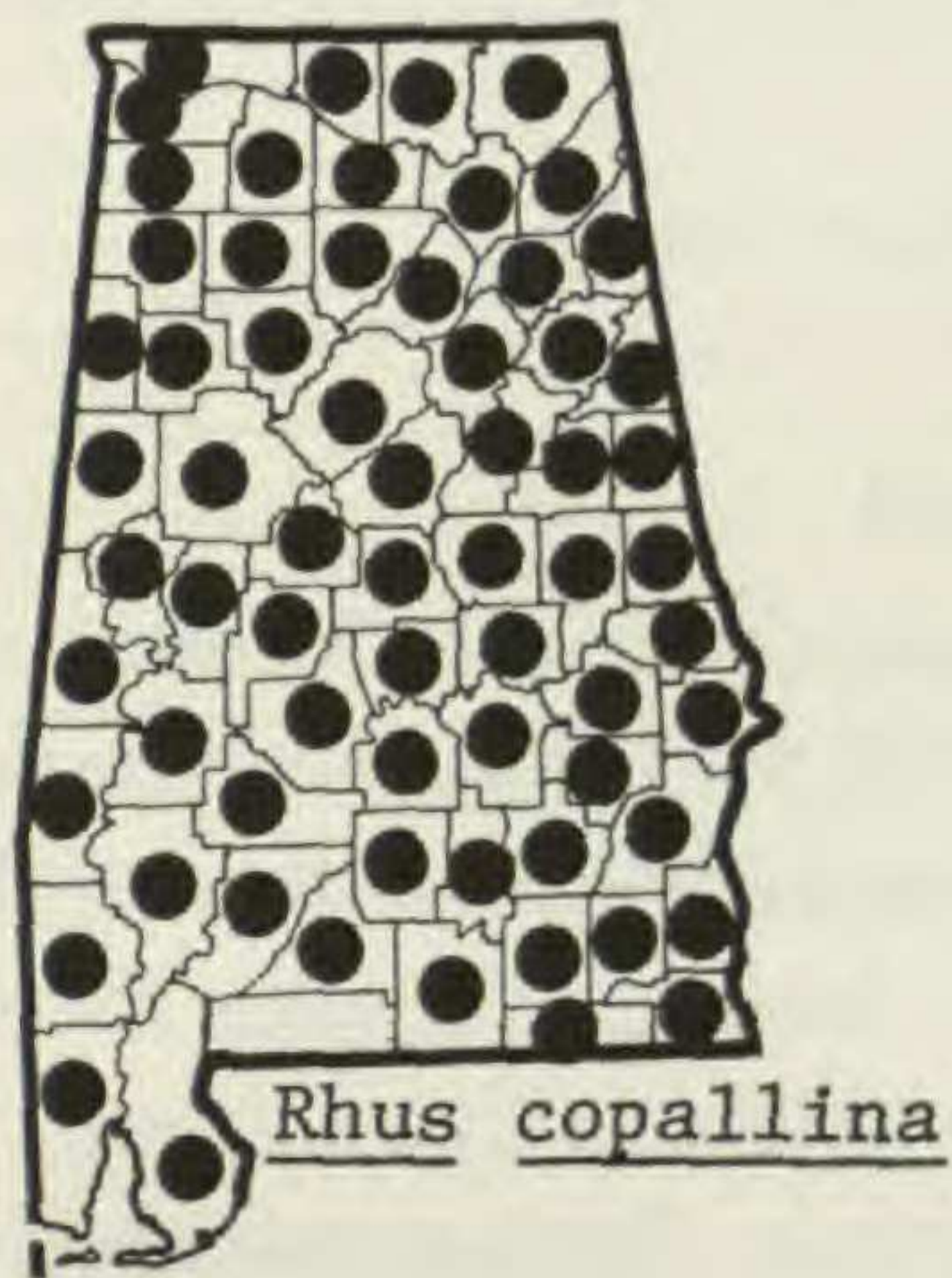
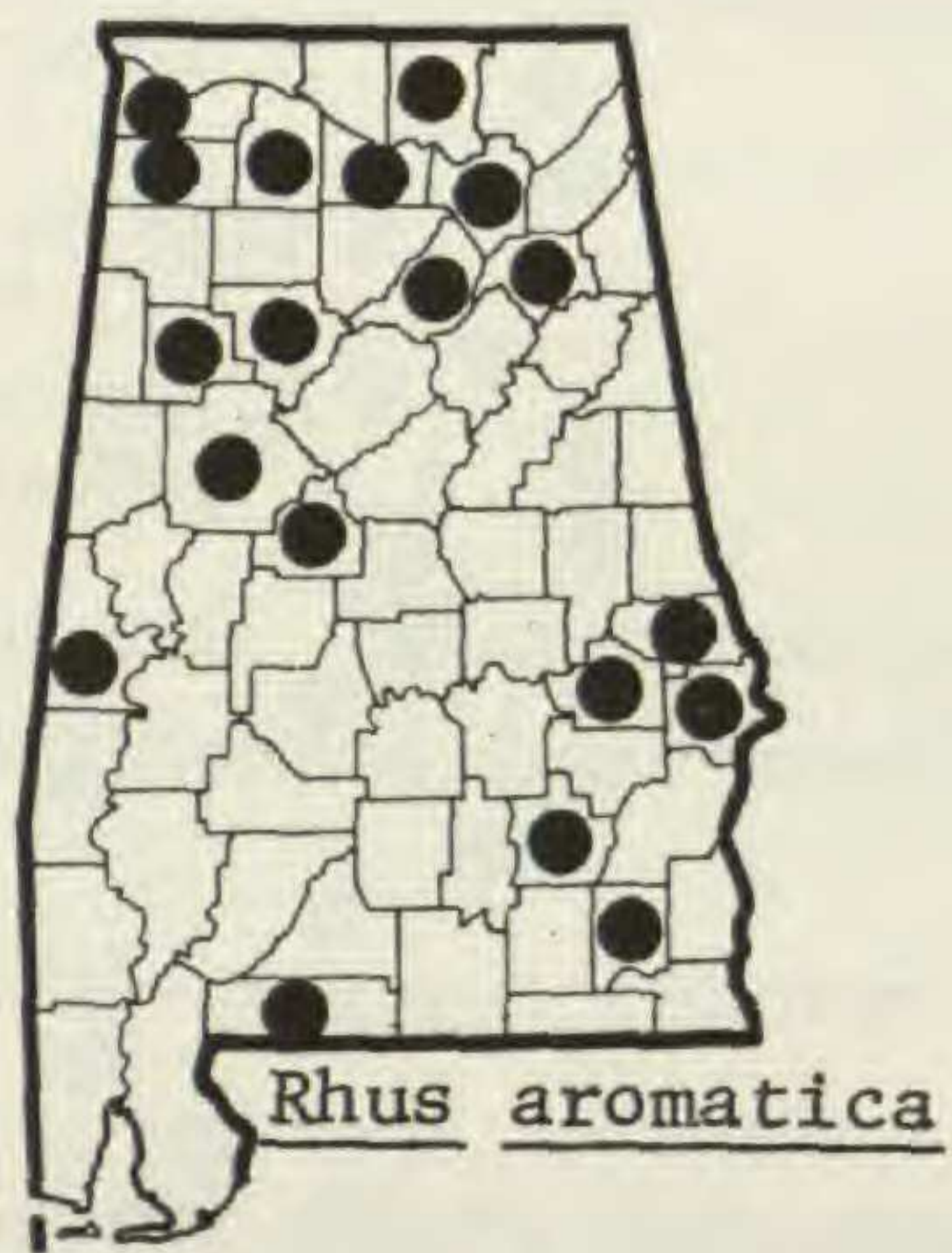
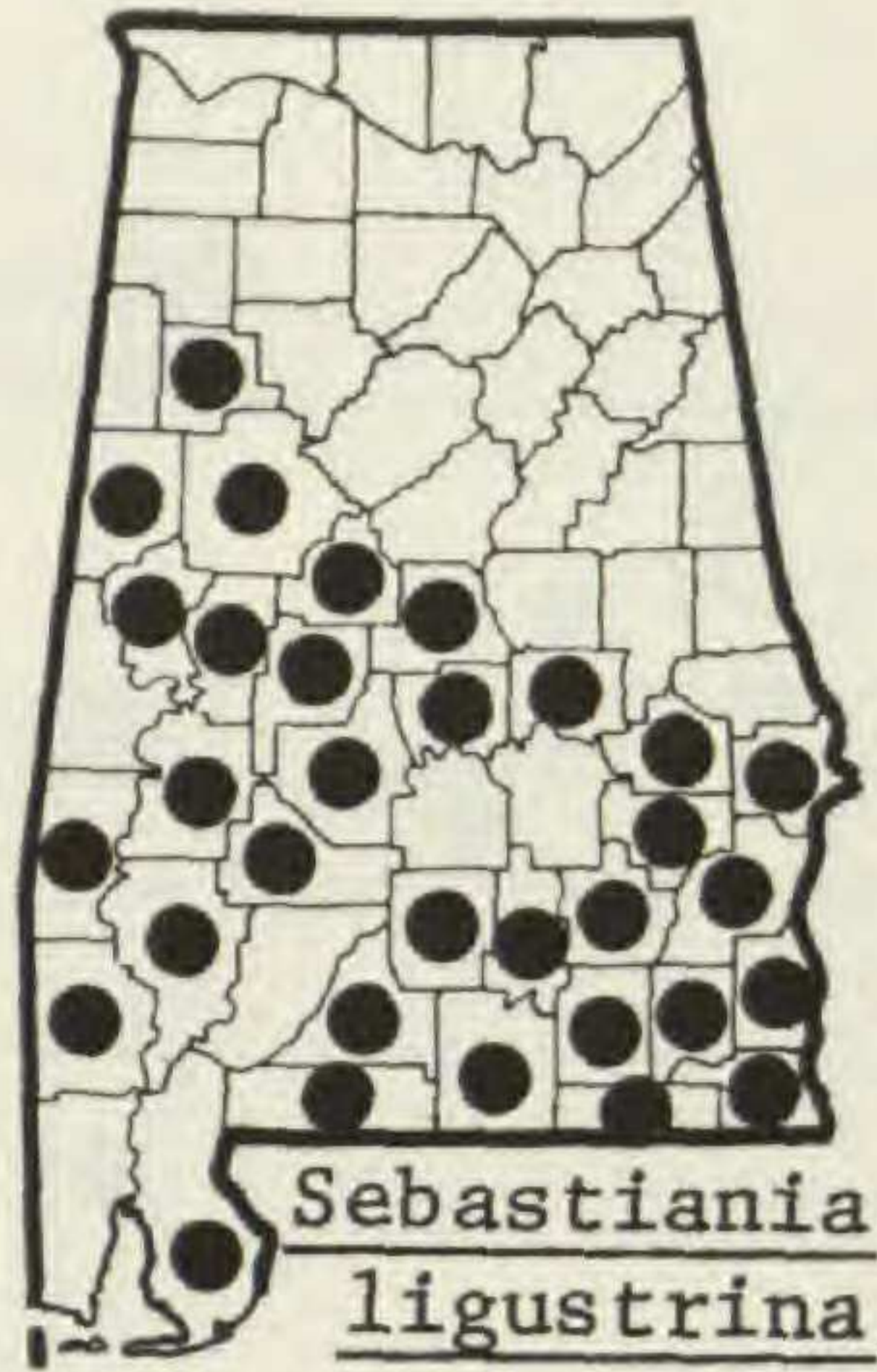
#### 4. *Sapium* Browne

1. *S. sebiferum* (L.) Roxburgh. Spring-early summer; summer-fall. Low thickets, rights-of-way; OCP and a single locality inland. *Triadica sebifera* (L.) Sm.—S; *S. sebiferum* Roxb.—M.

#### 5. *Sebastiania* Sprengel

1. *S. ligustrina* (Michaux) Muell.-Arg. Spring; summer. Swamp forests, alluvial woods; CP. *Sebastiania ligustrina* (Michx.) Muell.-Arg.—S.

35. ANACARDIACEAE



6. *Stillingia* Garden

1. *S. aquatica* Chapman. Spring-fall. Ponds, rare; OCP.

## 35. ANACARDIACEAE

1. Leaves simple ..... 1. *Cotinus*  
 1. Leaves compound ..... 2. *Rhus*

1. *Cotinus* Adanson, CHITTAM-WOOD, SMOKE-TREE

1. *C. obovatus* Rafinesque. Spring; spring-summer. Rocky woods, local; border of CuP and HR. *C. cotinoides* (Nutt.) Britt.—M; *C. americanus* Nutt.—H, S.

2. *Rhus* L.

1. Leaflets 3, or leaves absent at anthesis ..... 2  
 2. Leaves absent at anthesis ..... 1. *R. aromatica*  
 2. Leaves present ..... 3  
 3. Inflorescence terminal ..... 1. *R. aromatica*  
 3. Inflorescence axillary ..... 4. *R. radicans*  
 1. Leaflets 5 or more ..... 4  
 4. Inflorescence axillary ..... 6. *R. vernix*  
 4. Inflorescence terminal ..... 5  
 5. Leaf rachises winged, at least distally ..... 2. *R. copallina*  
 5. Leaf rachises not winged ..... 6  
 6. Twigs glabrous ..... 3. *R. glabra*  
 6. Twigs densely pubescent ..... 5. *R. typhina*

1. *R. aromatica* Aiton, FRAGRANT SUMAC. Winter-spring; summer-fall. Dry or rocky woods; CP (rare), CuP, VR, HR. More common northwestward. *Schmaltzia aromatica* (Ait.) Sm.—H; *S. crenata* (Mill.) Greene—H, S.

2. *R. copallina* L., DWARF SUMAC, WINGED SUMAC. Summer; summer-fall. Fields, fencerows, right-of-way, thickets; throughout.

3. *R. glabra* L., SMOOTH SUMAC. Spring-summer; summer-fall. Fields, fencerows, right-of-way, thickets; throughout.

4. *R. radicans* L. Spring; summer-fall.

1. Fruit glabrous; stems climbing or trailing ..... *R. radicans* var. *radicans*  
 1. Fruit pubescent; stems not climbing or trailing ..... *R. radicans* var. *toxicodendron*

*R. radicans* L. var. *radicans*, POISON IVY. Fields, thickets, woods; throughout. *Toxicodendron radicans* (L.) Kuntze—S; *T. goniocarpum* Greene—H.—One of Alabama's commonest woody plants.

*R. radicans* L. var. *toxicodendron* (L.) Persoon, POISON OAK. Fields, thickets, upland woods, more infrequent than the typical variety; throughout. *R. toxicodendron* L.—M, RAB; *Toxicodendron toxicodendron* (L.) Britt.—S; *T. quercifolium* (Steud.) Greene—H.

5. *R. typhina* L., STAGHORN SUMAC. Spring; summer. Margin of rich woods, very rare; HR. *R. hirta* (L.) Sudw.—S.—Only a single, small population is presently known.

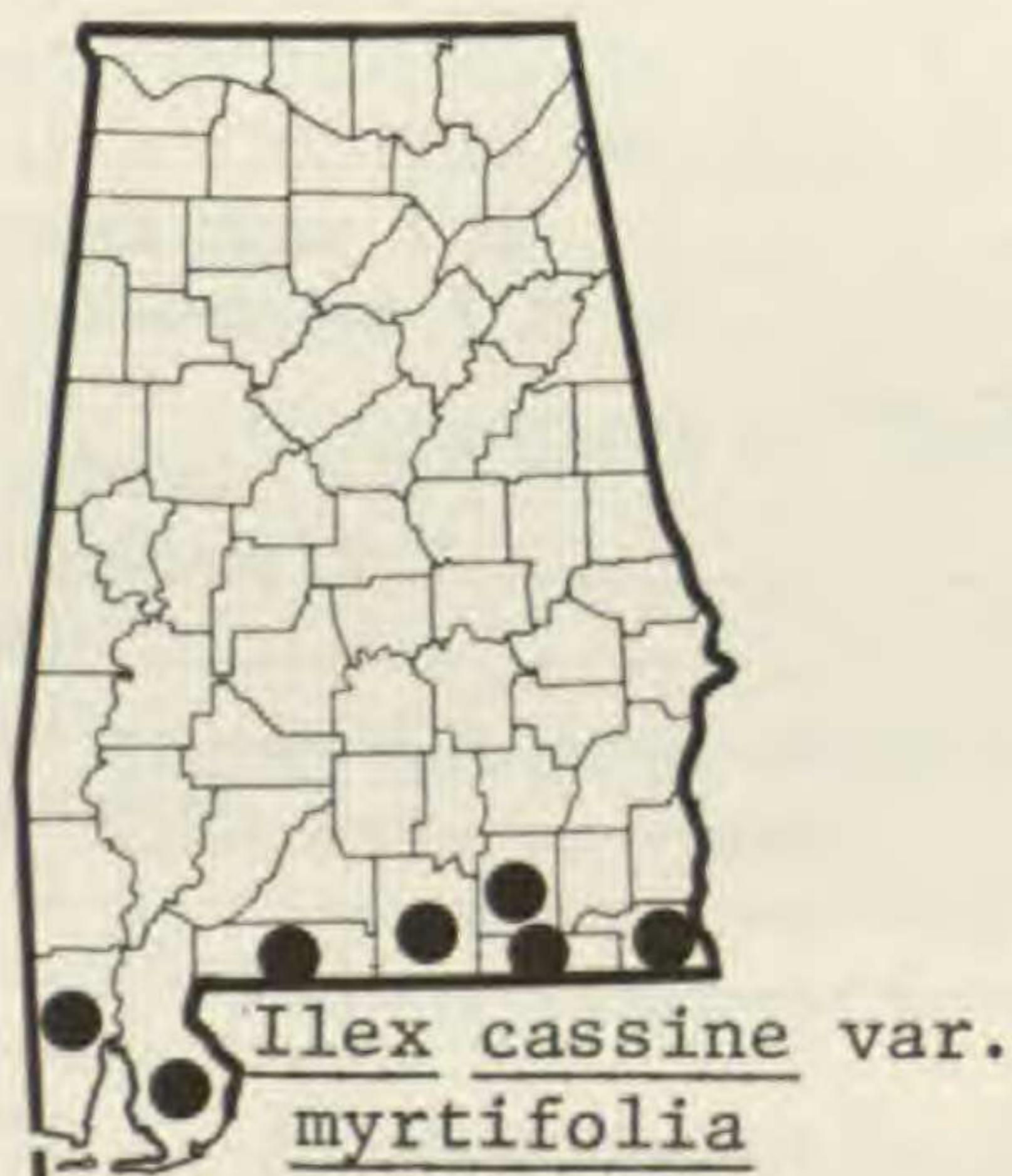
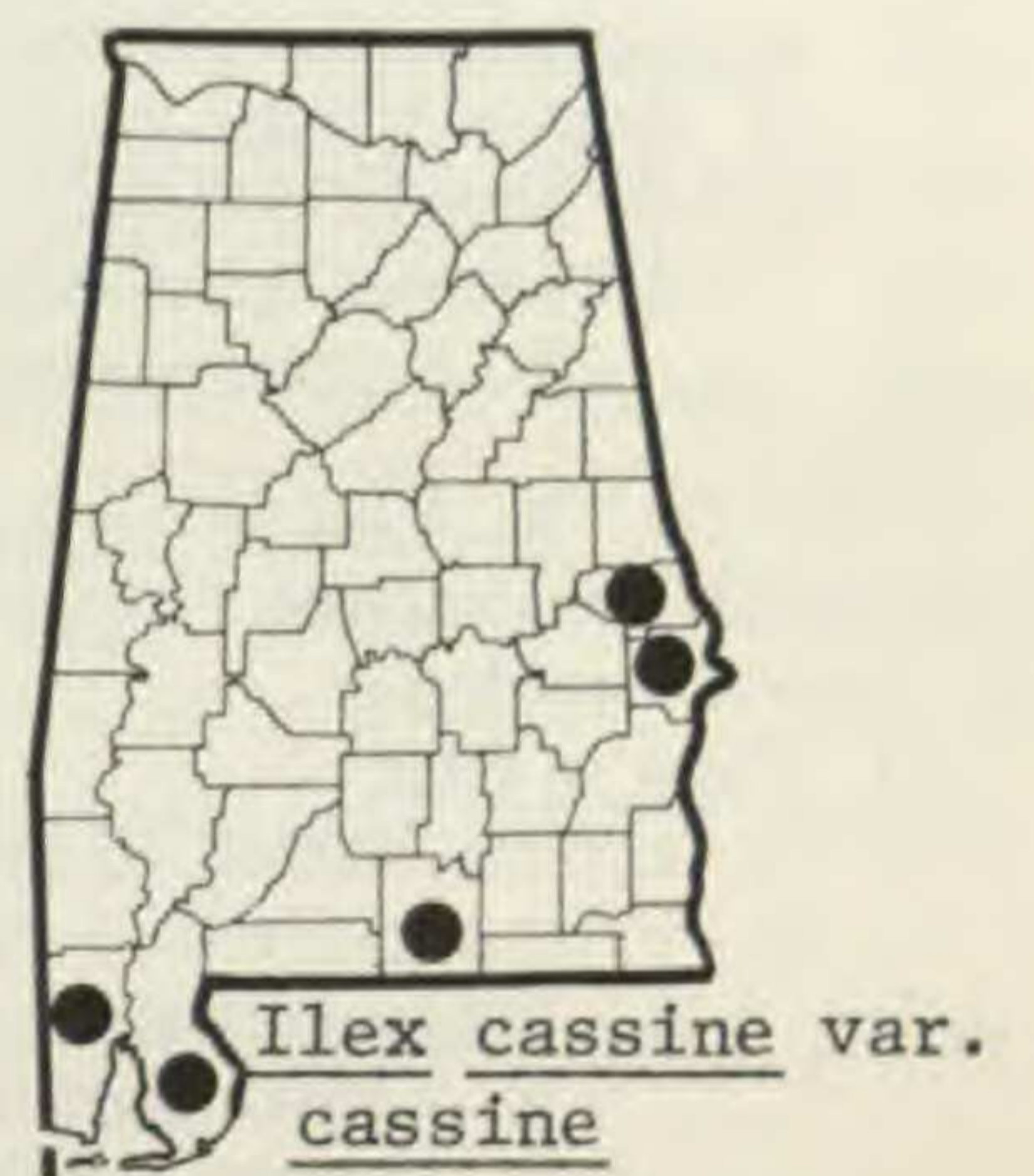
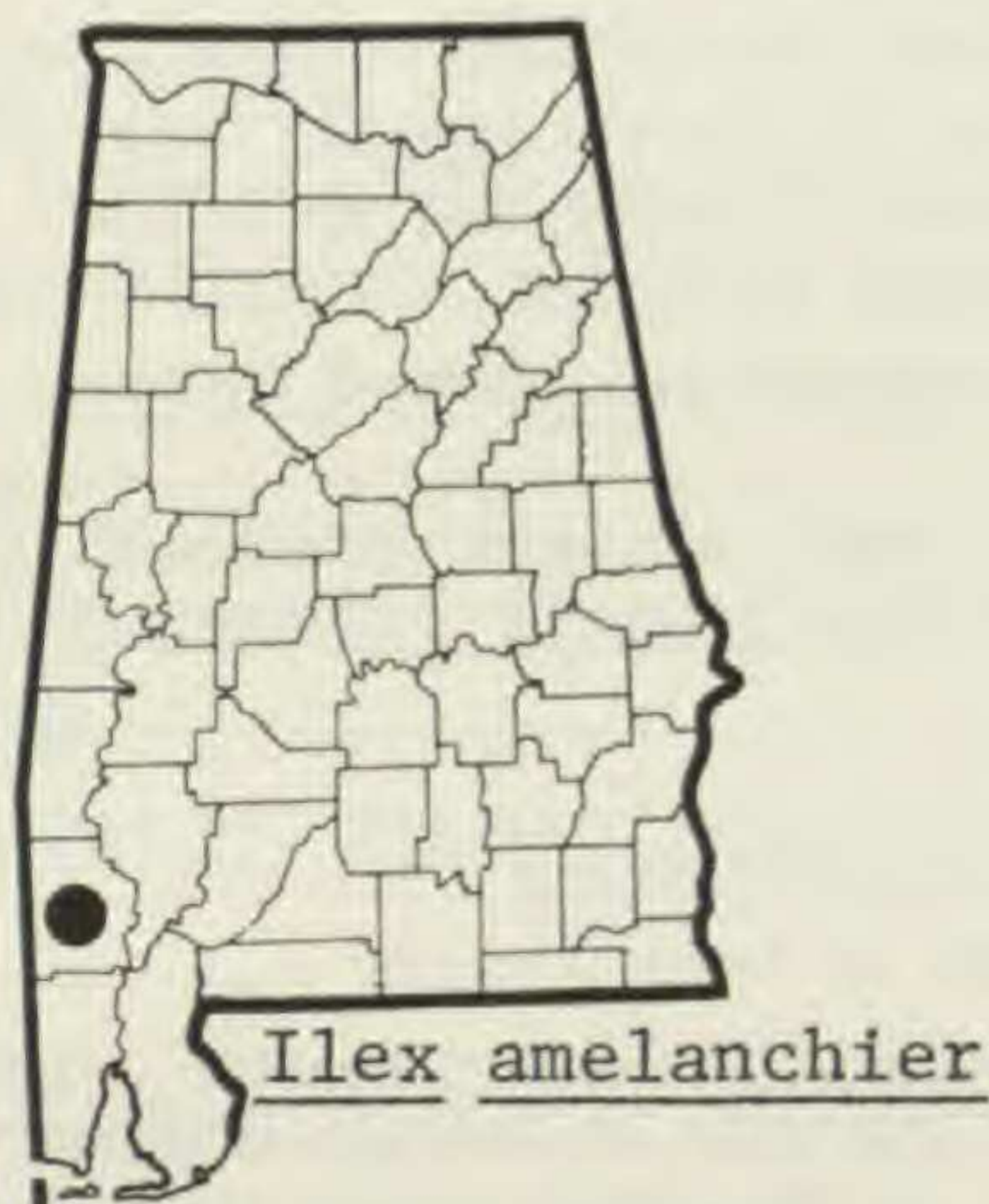
6. *R. vernix* L., POISON SUMAC, THUNDERWOOD. Spring; summer; Seepages, ditches, swamp ecotones; CP, AM. *Toxicodendron pinnatum* Mill.—H; *T. vernix* (L.) Kuntze—S.



36. CYRILLACEAE



37. AQUIFOLIACEAE



## 36. CYRILLACEAE

1. Stamens 10; fruit winged ..... 1. *Cliftonia*  
 1. Stamens 5; fruit wingless ..... 2. *Cyrilla*

1. *Cliftonia* Banks ex Gaertner, TITI

1. *C. monophylla* (Lamarck) Sargent. Spring-early summer; summer-fall. Ditches, creek swamps; OCP.—The validity of a single specimen from Macon County should be questioned.

2. *Cyrilla* L., TITI

1. *C. racemiflora* L. Spring-summer; summer-fall. Creek swamps, ditches, swamp ecotones, alluvial woods; chiefly CP.

## 37. AQUIFOLIACEAE

1. *Ilex* L., HOLLY

1. Leaves evergreen ..... 2  
 2. Leaves spinose-dentate, at least remotely so ..... 7. *I. opaca*  
 2. Leaves crenate, serrate or entire ..... 3  
 3. Leaves crenate throughout, not spinulose ..... 9. *I. vomitoria*  
 3. Leaves serrate, crenulate, or crenate apically only; often spinulose or entire ..... 4  
 4. Leaves remotely crenate apically, not spinulose ..... 6. *I. glabra*  
 4. Leaves spinulose-serrate or entire ..... 5  
 5. Leaves acute to emarginate, often 3 times or more as long as wide .....  
 ..... 3. *I. cassine*  
 5. Leaves (at least most) abruptly acuminate, less than 3 times as long as wide ..... 4. *I. coriacea*  
 1. Leaves deciduous ..... 6  
 6. Plant in fruit ..... 7  
 7. Pyrene smooth, lacking dorsal ribbing ..... 8. *I. verticillata*  
 7. Pyrene grooved or ribbed, at least dorsally ..... 8  
 8. Sepals eciliate ..... 9  
 9. Leaves narrowly cuneate, or margin distinctly crenate-serrate ..... 5. *I. decidua*  
 9. Leaves rounded to truncate, entire to serrate, not regularly crenate-serrate ..... 2. *I. amelanchier*  
 8. Sepals ciliate ..... 10  
 10. Pedicels less than 5 mm long ..... 1. *I. ambigua*  
 10. Pedicels more than 5 mm long ..... 2. *I. amelanchier*  
 6. Plant in flower ..... 11  
 11. Staminate flowers present ..... 12  
 12. Inflorescence a pedunculate cyme ..... 13  
 13. Sepals ciliate ..... 8. *I. verticillata*  
 13. Sepals eciliate ..... 2. *I. amelanchier*  
 12. Inflorescence not pedunculate; flowers pedicellate only ..... 14  
 14. Sepals, petals and stamens 4 ..... 5. *I. decidua*  
 14. Sepals, petals and stamens 5 or more ..... 1. *I. ambigua*  
 11. Pistillate flowers or immature fruit present ..... 15  
 15. Pedicels less than 5 mm long ..... 16  
 16. Sepals eciliate ..... 5. *I. decidua*  
 16. Sepals ciliate ..... 17  
 17. Petals ciliate ..... 1. *I. ambigua*  
 17. Petals eciliate ..... 8. *I. verticillata*  
 15. Pedicels more than 5 mm long ..... 18  
 18. Leaves narrowly cuneate, or margin distinctly crenate-serrate .....  
 ..... 5. *I. decidua*  
 18. Leaves rounded to truncate, entire to serrate, not regularly crenate-serrate ..... 2. *I. amelanchier*

1. *I. ambigua* (Michaux) Torrey. Spring; summer-fall. Mesic woods, infrequent; throughout. *I. monticola* Gray—M, S; *I. monticola mollis* (Gray) Britt., *I. caroliniana* Walt.—M.—*Ilex ambigua* var. *montana* (T. & G.) Ahles is a recognizable entity east and north of Alabama, but the writer has not seen any Alabama plants to which this name should be applied.

2. *I. amelanchier* Curtis. Spring; fall. Low woods, very rare; CP.

3. *I. cassine* L. Spring; fall-spring.

1. Leaves, at least some, ovate to obovate ..... *I. cassine* var. *cassine*

1. Leaves lanceolate to narrowly elliptic ..... *I. cassine* var. *myrtifolia*

*I. cassine* L. var. *cassine*, CASSENA, DAHOON. Low ground, rare; CP.

*I. cassine* L. var. *myrtifolia* (Walter) Sargent, YAUPON. Ponds; OCP. *I. myrtifolia* Walt.—M, H, S.

4. *I. coriacea* (Pursh) Chapman, GALLBERRY. Spring; fall-spring. Low woods, seepages, swamp ecotones; OCP.

5. *I. decidua* Walter. Spring; late summer-fall. Upland and low woods, thickets, most common in circumneutral situations; CP, AM, CuP, VR, HR. *I. longipes* Chapm.—M, H, S; *I. decidua* var. *longipes* (Chapm.) Ahles—RAB.—This taxon is extremely polymorphic west and south of the Appalachians. *Ilex longipes* Chapm. has often been applied to plants with relatively long pedicels, but this character is not discontinuous and has been used too subjectively. *Ilex collina* Alexander has been applied to plants with relatively large leaves. This complex needs intensive study.

6. *I. glabra* (L.) Gray, GALLBERRY. Spring; fall-spring. Low woods, thickets, seepages, swamp ecotones; CP.

7. *I. opaca* Aiton, COMMON H. Spring; fall-spring. Low and upland woods; throughout.

8. *I. verticillata* (L.) Gray. Spring; fall. Seepages, bogs, streambanks, infrequent; throughout.

9. *I. vomitoria* Aiton, YAUPON. Spring; fall-spring. Sandy woods and thickets; CP, CuP (very rare).

### 38. CELASTRACEAE

1. Leaves alternate; plant a twining vine ..... 1. *Celastrus*

1. Leaves opposite; plant shrubby ..... 2. *Euonymus*

#### 1. *Celastrus* L., BITTERSWEET

1. *C. scandens* L. Spring; summer-fall. Rocky woods, rare; CuP, HR.

#### 2. *Euonymus* L.

1. Leaves variegated, of two contrasting colors ..... 3. *E. fortunei* var. *radicans*

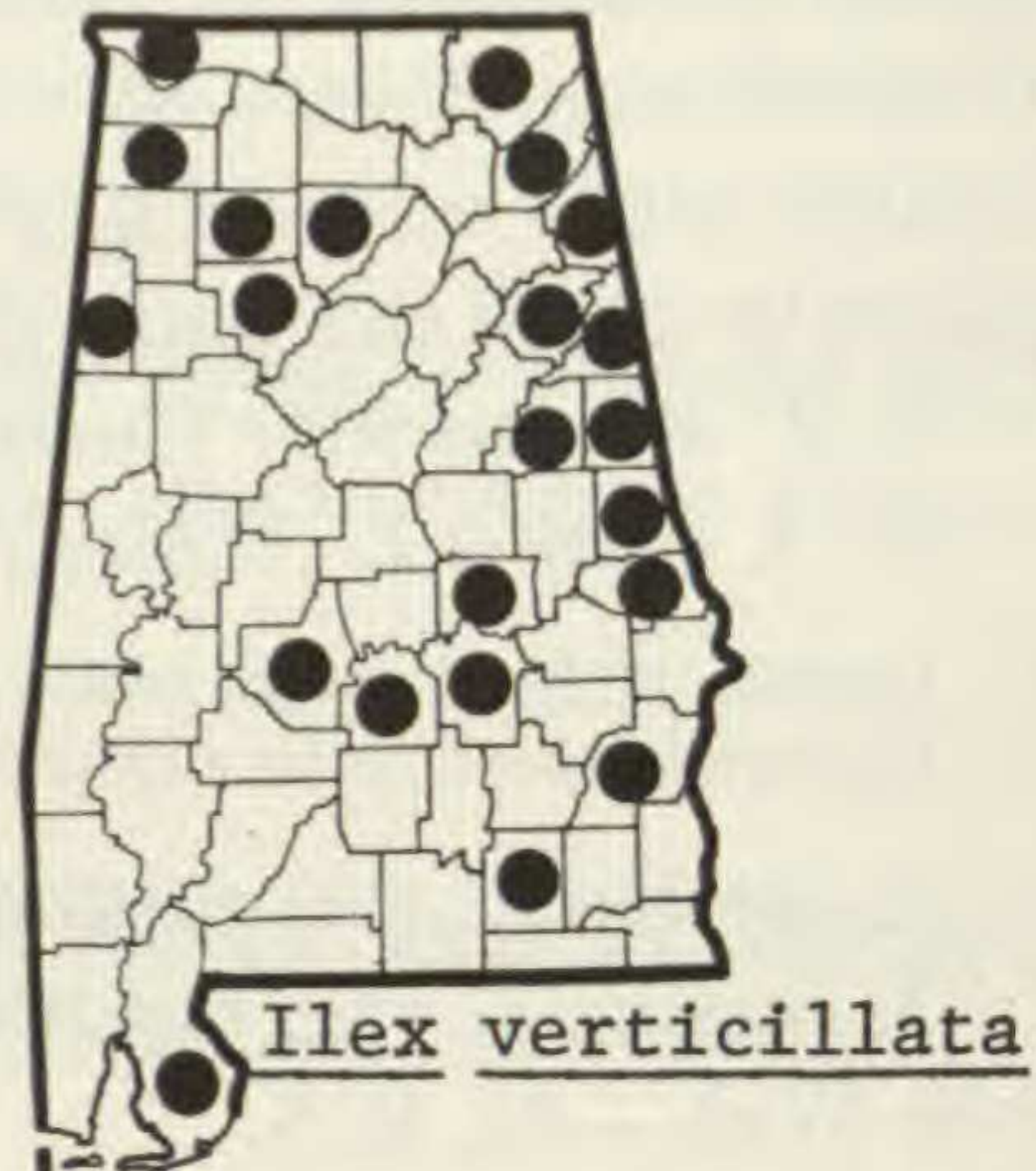
1. Leaves not variegated ..... 2

2. Flowers 4-merous; fruit smooth ..... 2. *E. atropurpureus*

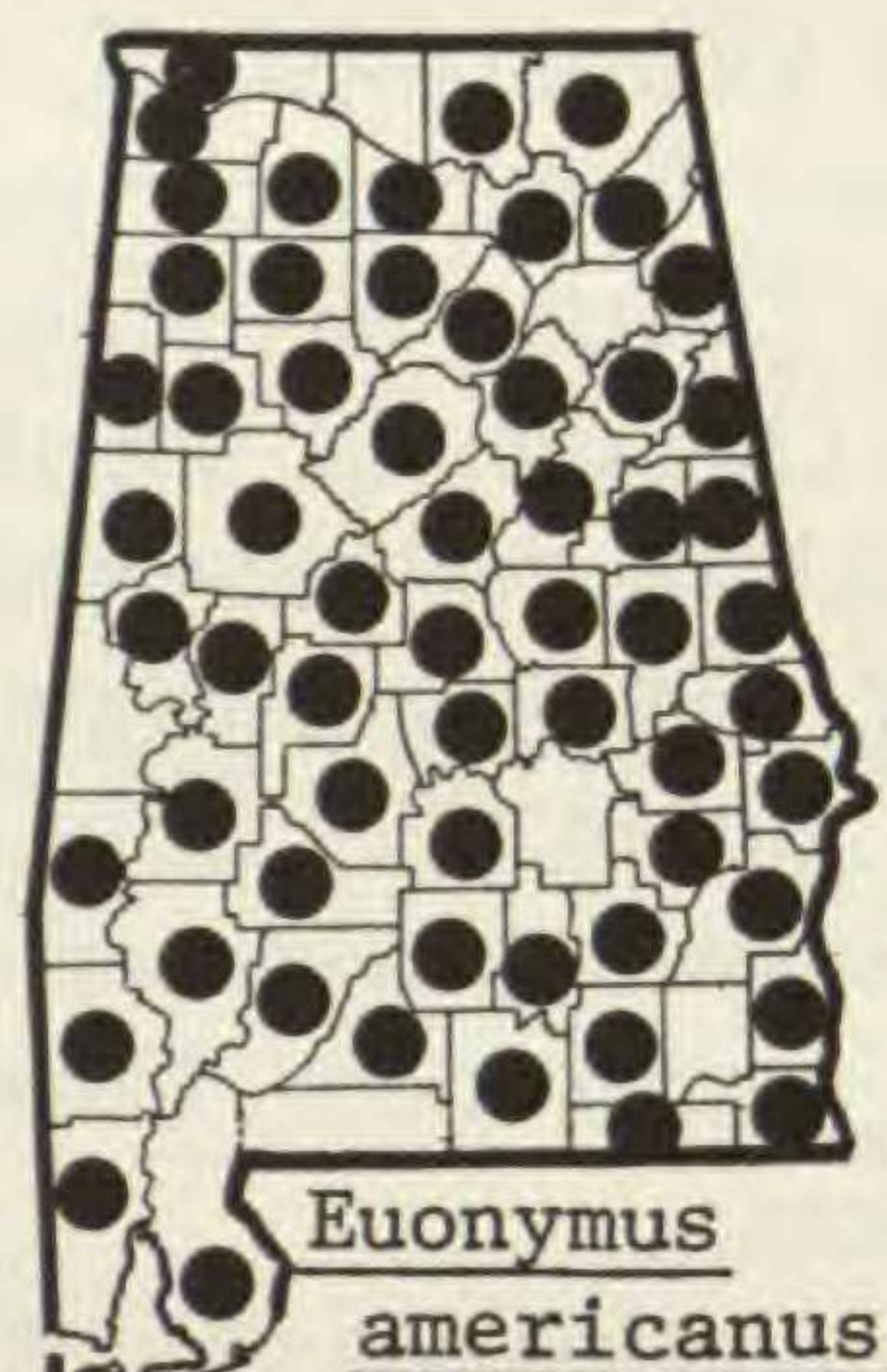
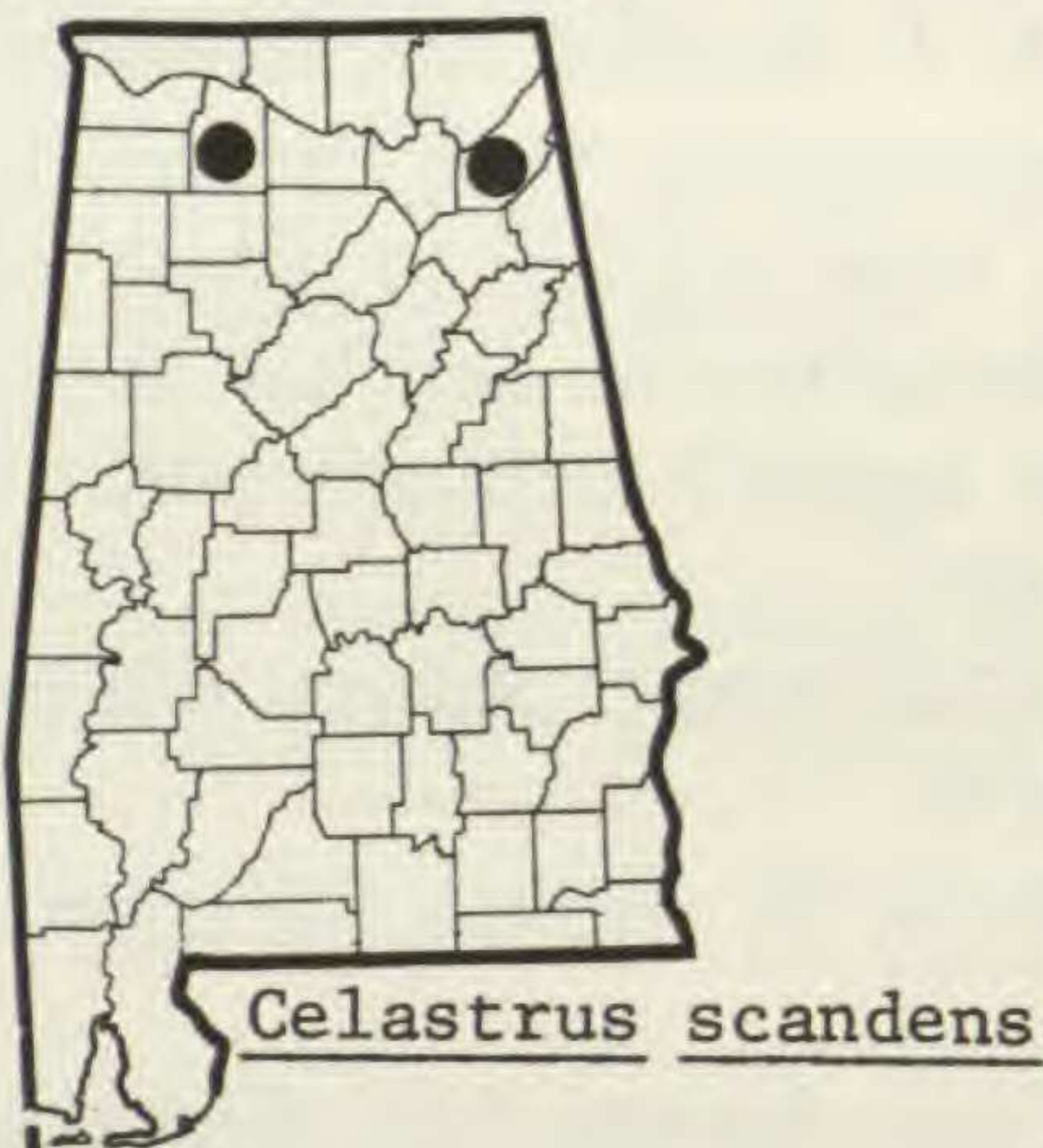
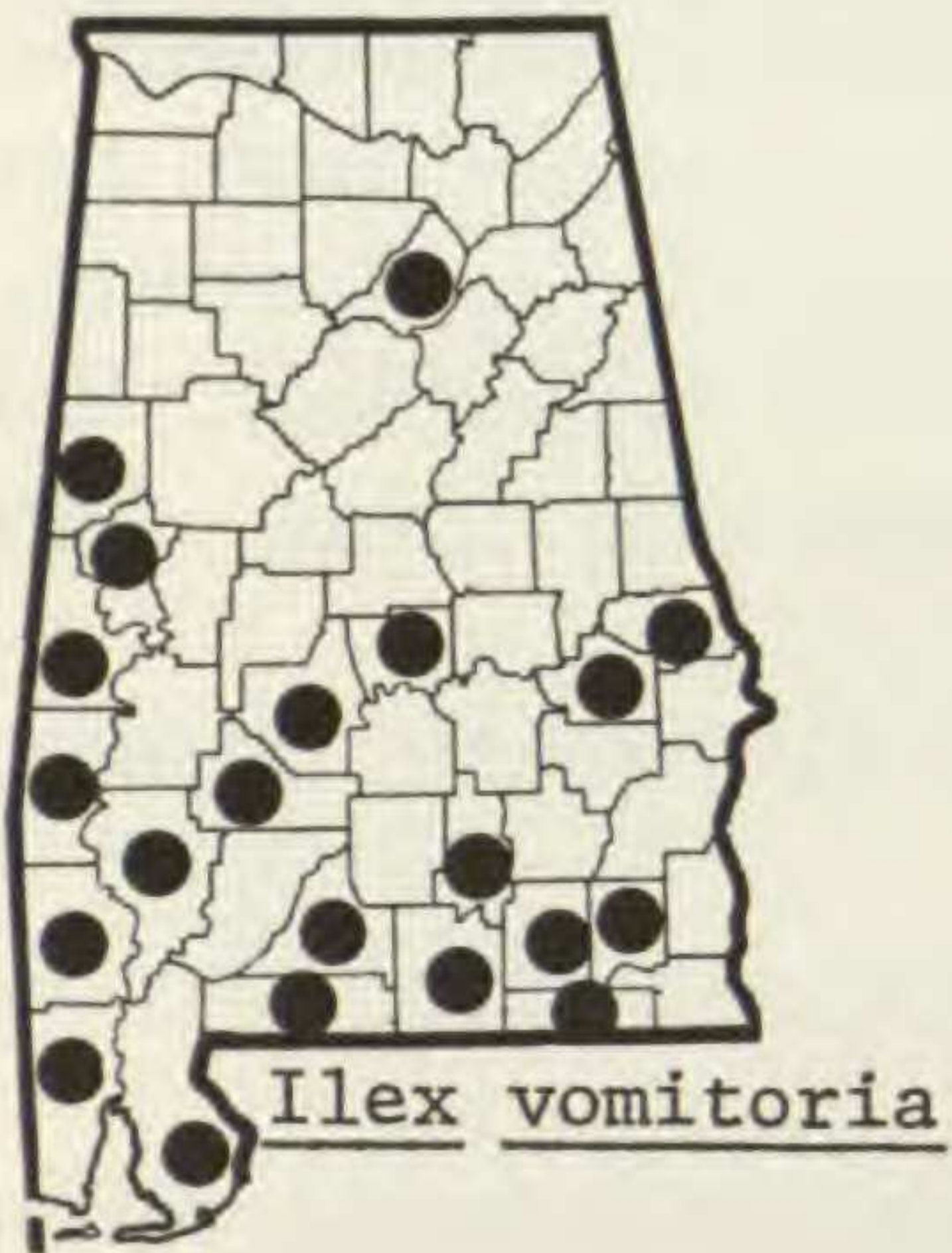
2. Flowers 5-merous; fruit tuberculate ..... 1. *E. americanus*

1. *E. americanus* L., STRAWBERRY BUSH. Spring; late summer-fall. Rich and low woods, fencerows and thickets; throughout.

2. *E. atropurpureus* Jacquin, WAHOO. Spring; late summer-fall. Rich woods over calcareous substrata, rare; CP, CuP, HR.



38. CELASTRACEAE



39. STAPHYLEACEAE



var. radicans



3. *E. fortunei* Hand.-Mazz. var. *radicans* Rehder. Flowers, fruit not seen. Occasionally persistent and rarely spreading; HR.

## 39. STAPHYLEACEAE

1. *Staphylea* L., BLADDERNUT

1. *S. trifolia* L. Spring; summer-fall. Alluvial and rich woods; CP (rare), AM, CuP, VR, HR.

## 40. ACERACEAE

1. *Acer* L., MAPLE

- |  |                          |
|--|--------------------------|
| 1. Leaves compound   | 1. <i>A. negundo</i>     |
| 1. Leaves simple, or absent at anthesis  | 2                        |
| 2. Inflorescence terminal  | 4. <i>A. saccharum</i>   |
| 2. Inflorescence axillary  | 3                        |
| 3. Petals similar to sepals; fruit 2.5 cm or less long; pedicel longer than fruit, often more than twice as long | 2. <i>A. rubrum</i>      |
| 3. Petals absent; fruit 4 cm or more long; pedicel shorter than fruit  | 3. <i>A. saccharinum</i> |

1. *A. negundo* L., BOX-ELDER. Spring; spring-fall. Ditches, low woods; throughout, infrequent to rare in OCP. *Negundo negundo* (L.) Karst.—S.

2. *A. rubrum* L., RED M. Winter-spring; spring-fall.

1. Leaves glabrous beneath, or pubescent only near the principal veins — *A. rubrum* var. *rubrum*

1. Leaves pubescent beneath — *A. rubrum* var. *drummondii*

*A. rubrum* L. var. *rubrum*. Low or upland woods; throughout. *Rufacer rubrum* (L.) Sm., *R. carolinianum* (Walt.) Sm.—S.

*A. rubrum* L. var. *drummondii* (Hooker & Arnold) Sargent. Low or upland woods, infrequent; throughout. *Rufacer drummondii* (Hook. & Arn.) Sm.—S.

3. *A. saccharinum* L., SILVER M. Winter-spring; spring-summer. Low woods, streambanks, infrequent; CP, P, VR, HR.

4. *A. saccharum* Marshall, SUGAR M.

1. Leaves either essentially glabrous or strongly glaucous beneath — 2

2. Leaves essentially glabrous beneath, pubescence when present, confined to larger veins — *A. saccharum* subsp. *saccharum*

2. Leaves pubescent beneath, the pubescence not confined to the veins or veinlets — *A. saccharum* subsp. *floridanum*

1. Leaves pubescent and greenish beneath — 3

3. Leaves averaging more than 10 cm long; bark dark, roughened — *A. saccharum* subsp. *nigrum*

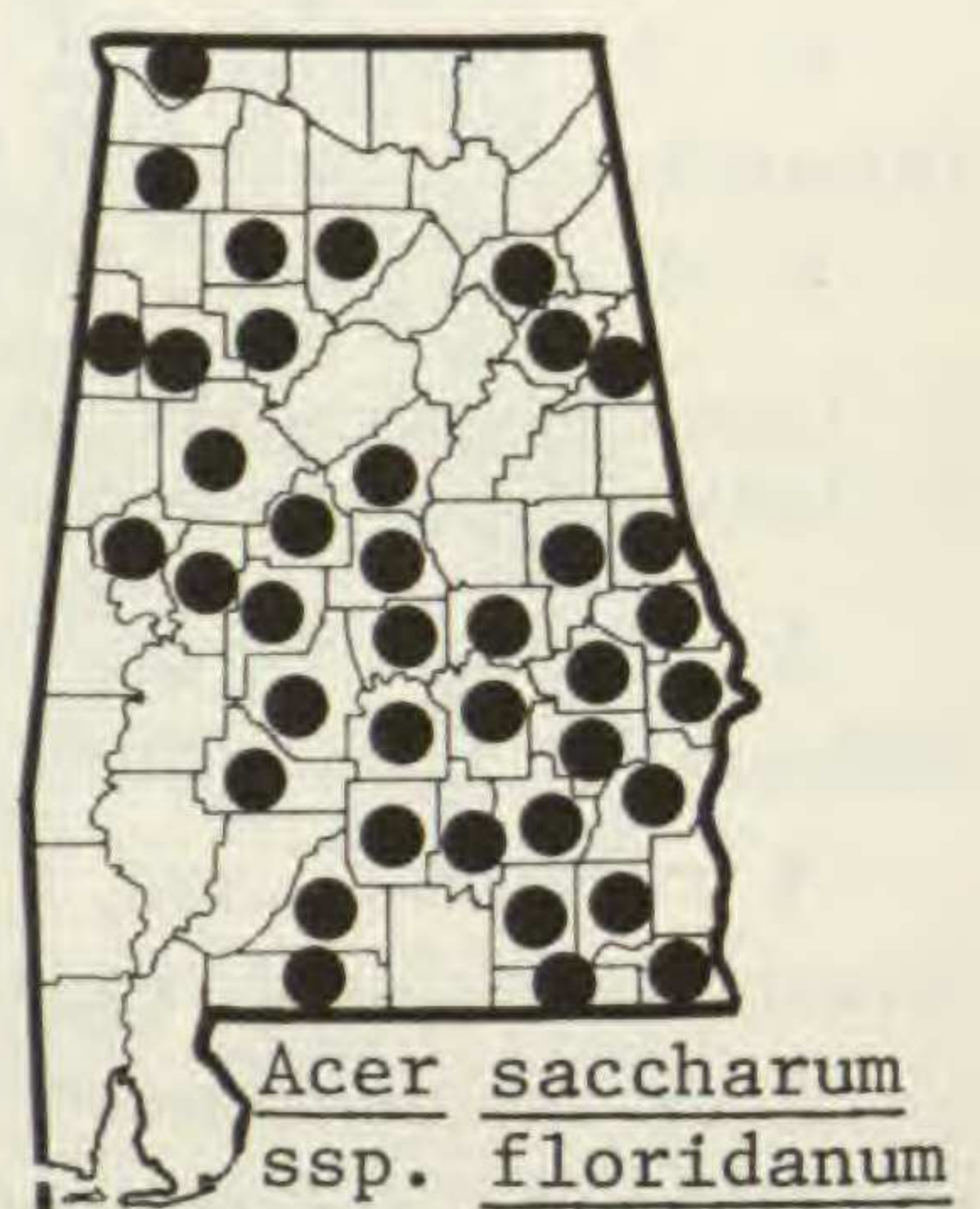
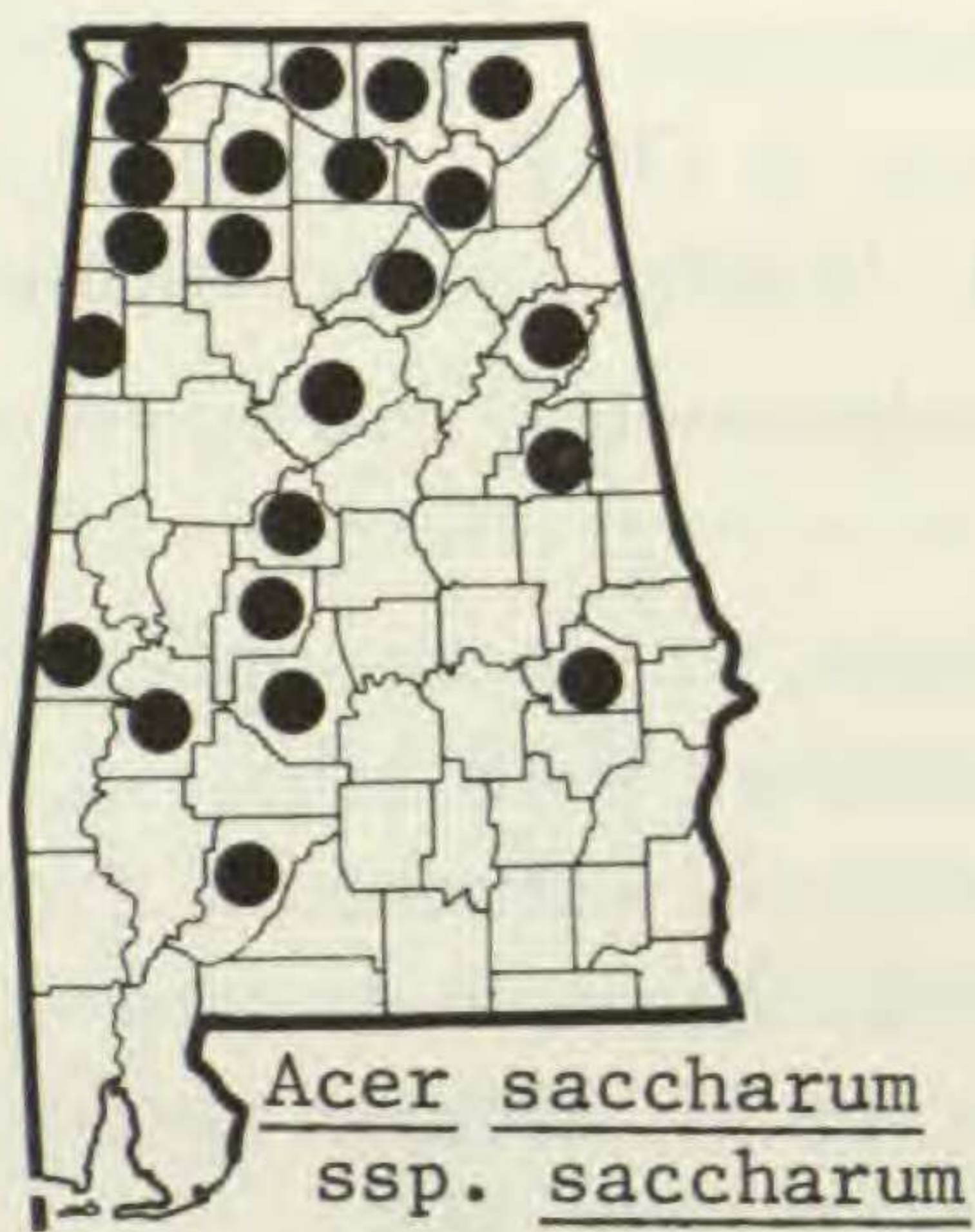
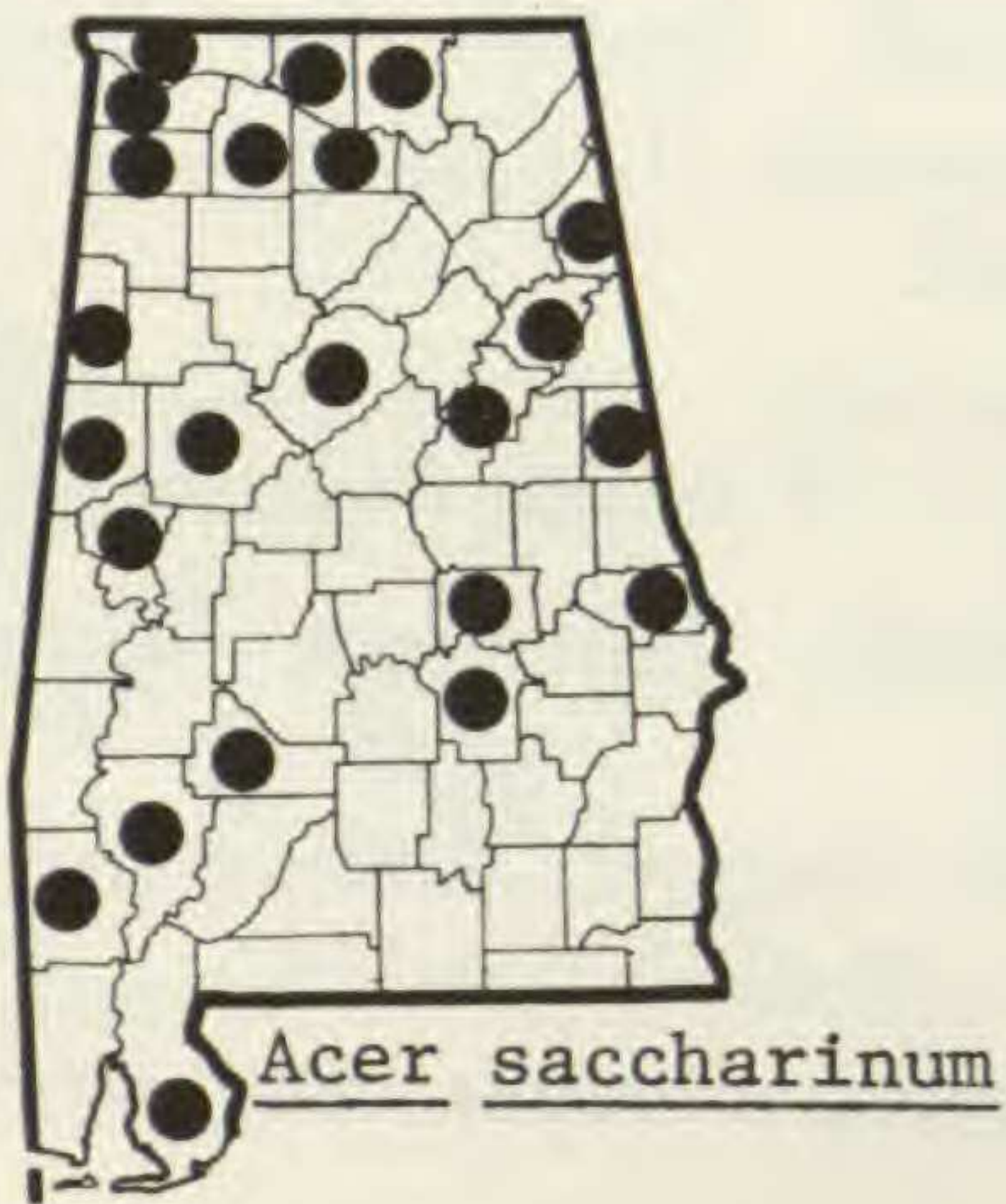
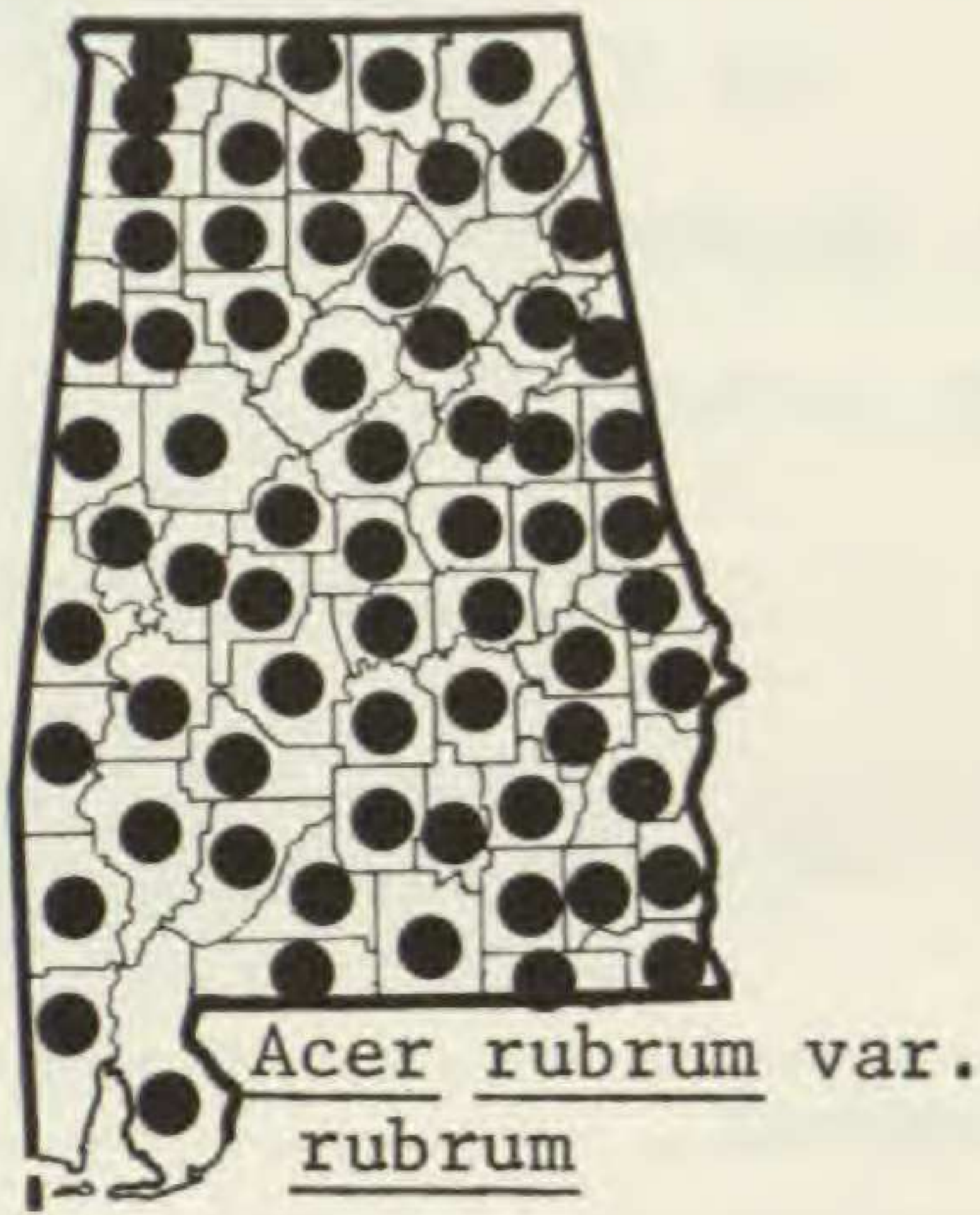
3. Leaves averaging less than 10 cm long; bark whitish, smooth or tardily cracking — *A. saccharum* subsp. *leucoderme*

*A. saccharum* Marshall subsp. *saccharum*, ROCK M., HARD M. Spring; summer. Rich woods, rare southward; throughout. *Saccharodendron barbatum* (Michx.) Niewl.—S.

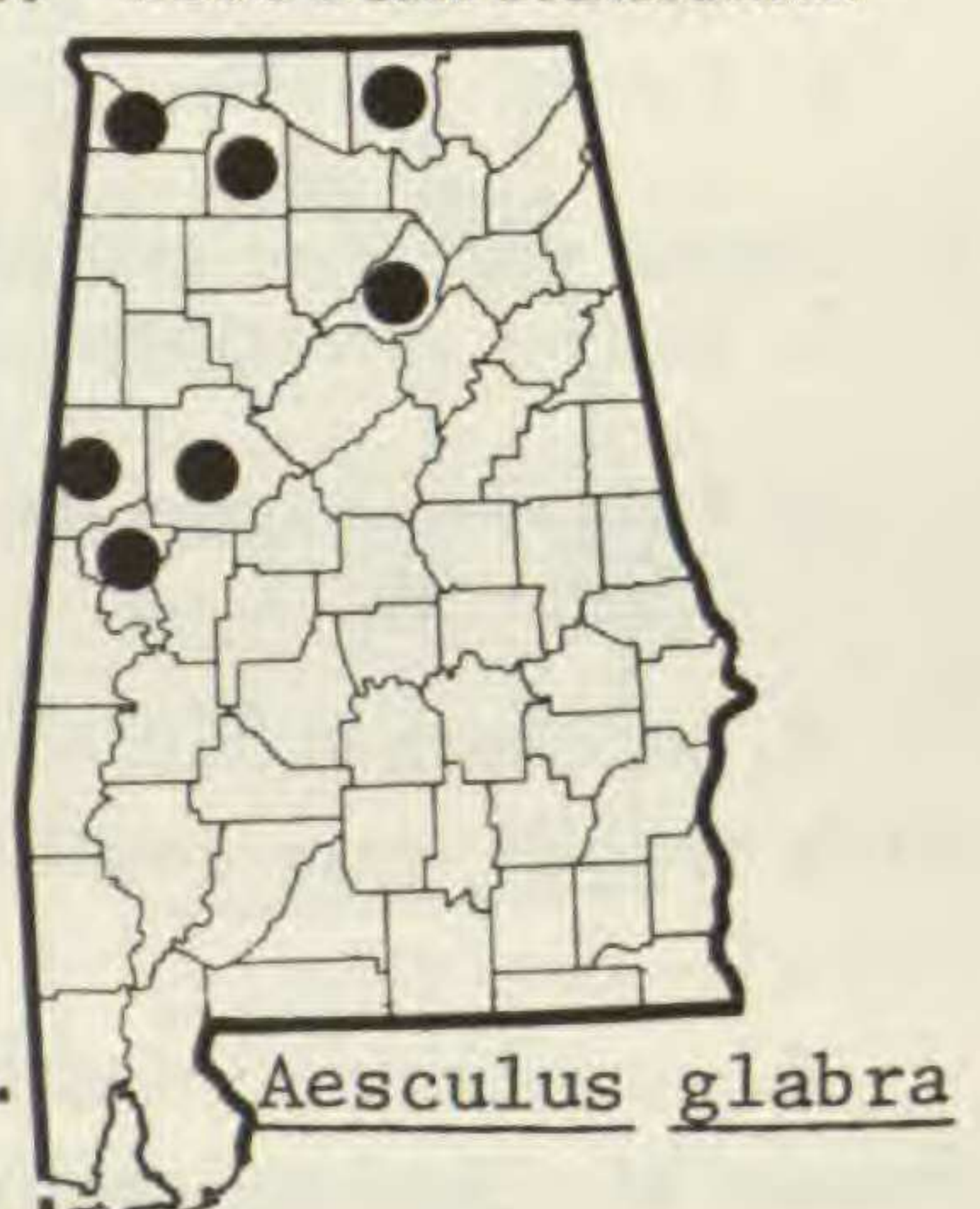
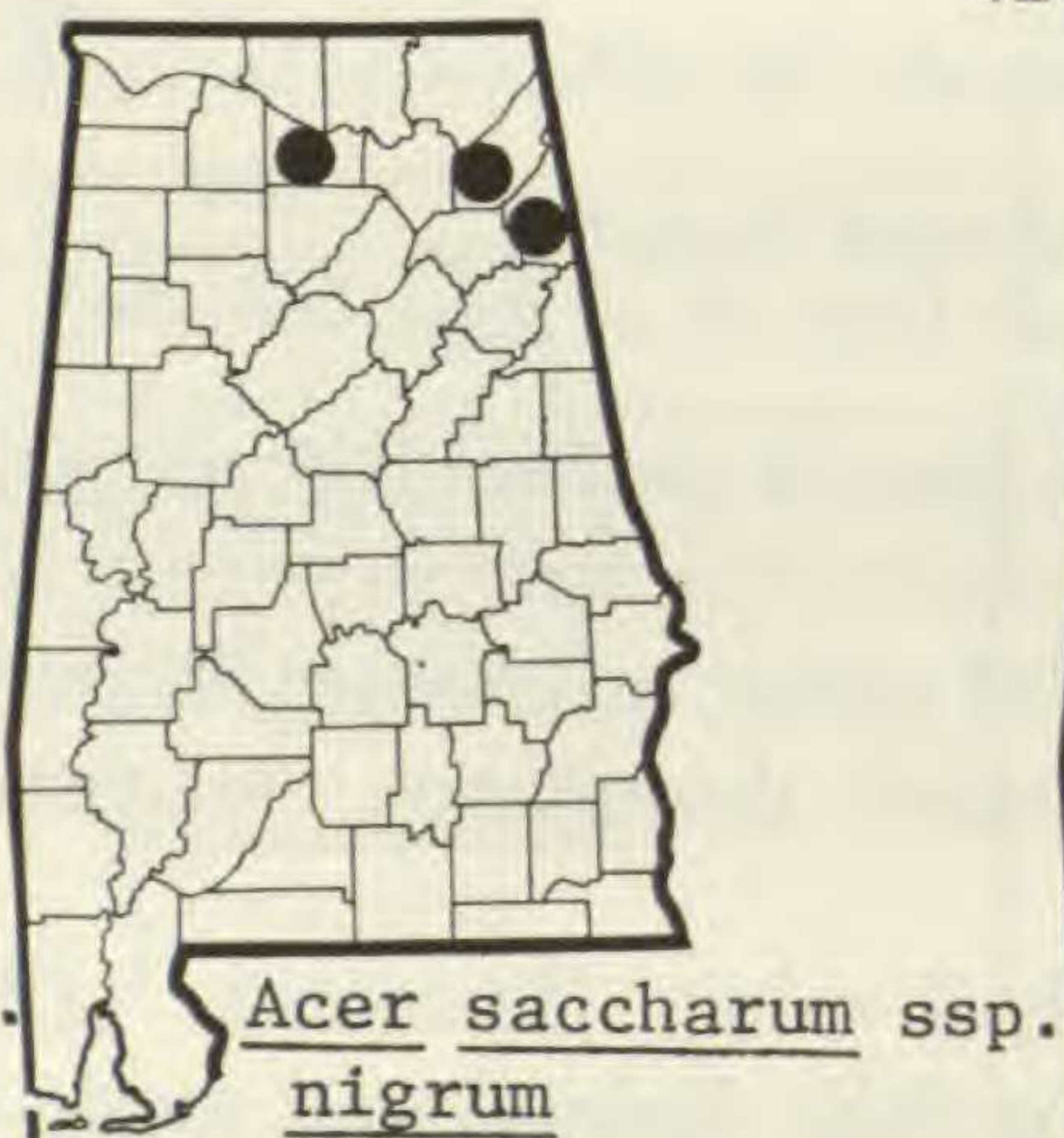
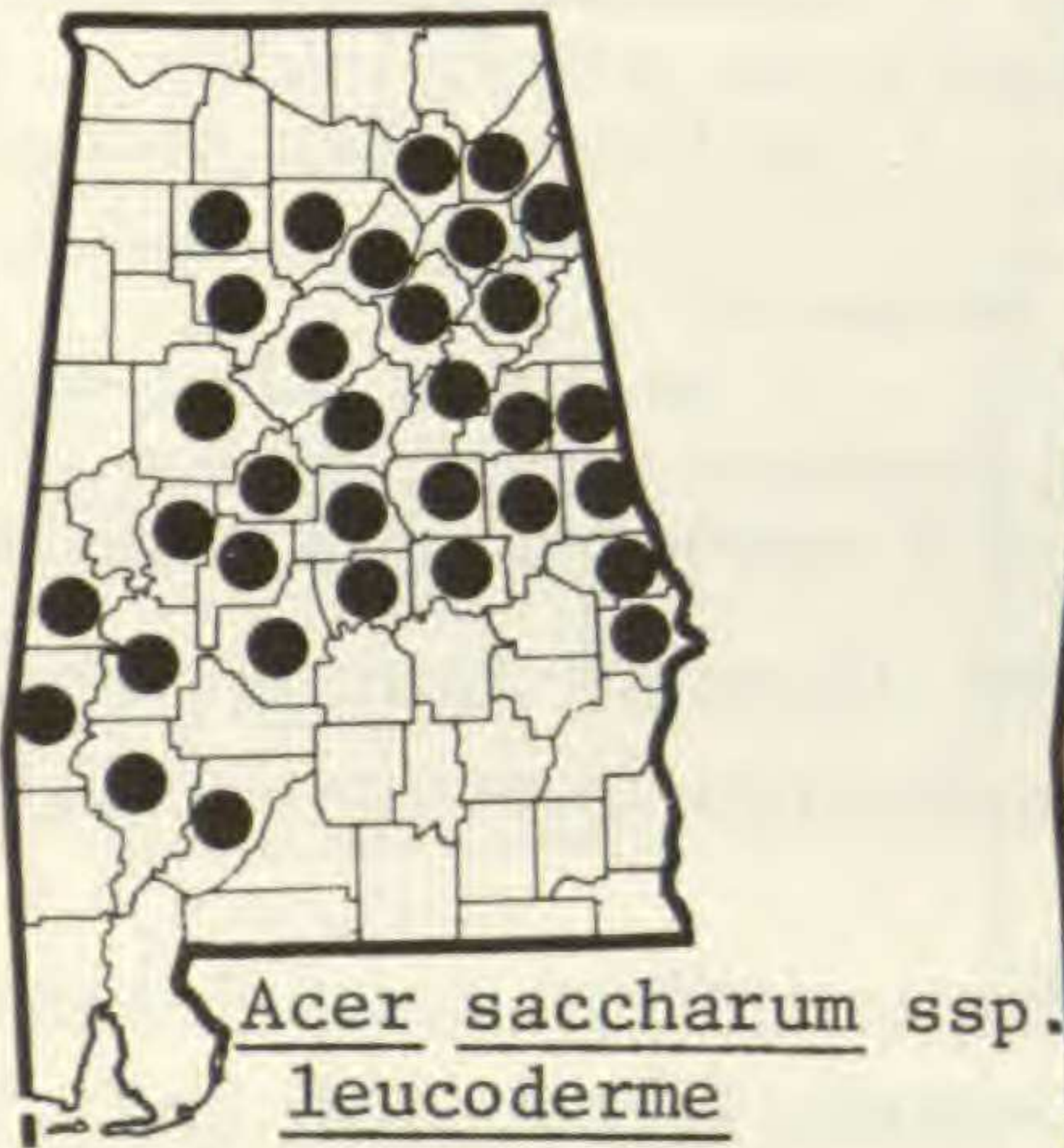
*A. saccharum* Marshall subsp. *floridanum* (Chapm.) Desmarais, SOUTHERN SUGAR M. Spring; spring-fall. Upland and mesic woods; CP, P, AM, CuP, VR. *Saccharodendron floridanum* (Chapm.) Niewl.—S; *A. floridanum* (Chapm.) Pax —M, H.

*A. saccharum* Marshall subsp. *leucoderme* (Small) Desmarais, CHALK-BARK

40. ACERACEAE



41. HIPPOCASTANACEAE



M. Spring; spring-fall. Upland woods, river bluffs, local; CP, P, AM, VR, CuP. Apparently absent from southeastern CP. *A. leucoderme* Sm.—M, H; *Saccharodendron leucoderme* (Sm.) Niewl.—S.

*A. saccharum* Marshall subsp. *nigrum* (Michaux f.) Desmarais. Rich woods, rare; CuP, HR. *Saccharodendron nigrum* (Michx.) Sm.—S.

#### 41. HIPPOCASTANACEAE

##### 1. *Aesculus* L., BUCKEYE

- |  |       |                         |
|--|-------|-------------------------|
| 1. Flowers white; stamens 3-4 times as long as petals; inflorescence 2-3 dm long                               | ----- | 3. <i>A. parviflora</i> |
| 1. Flowers yellow to red; stamens 2 or less times as long as petals; inflorescence usually less than 2 dm long | ----- | 2                       |
| 2. Petals subequal; flowers pale yellow to greenish-yellow   | ----- | 1. <i>A. glabra</i>     |
| 2. Petals of two distinct lengths; flowers yellow to red   | ----- | 3                       |
| 3. Margins of lateral petals eglandular; stamens included within lateral petals                                | ----- | 4                       |
| 4. Pedicels stipitate-glandular  | ----- | 2. <i>A. octandra</i>   |
| 4. Pedicels eglandular   | ----- | 5. <i>A. sylvatica</i>  |
| 3. Margins of lateral petals glandular; stamens exerted beyond lateral petals                                  | ----- | 4. <i>A. pavia</i>      |

1. *A. glabra* Willd. Spring; summer. Rich woods, rare; CP, CuP, HR.

2. *A. octandra* Marshall. Spring; summer. Rich woods, rare; northeastern CuP.

3. *A. parviflora* Bartram, BOTTLEBRUSH B. Late spring-summer; late summer-fall. Rich woods, usually in circumneutral soil, local; CP, P, AM, VR, CuP.

4. *A. pavia* L., RED B. Spring; summer. Deciduous woodland borders and openings; throughout.

5. *A. sylvatica* Bartram. Spring; summer. Mesic or low woods, infrequent; CP (rare), AM, CuP. *A. octandra* Marsh.—S, in part.

#### 42. SAPINDACEAE

##### 1. *Sapindus* L., SOAP-BERRY

1. *S. marginatus* Willd. Spring; fall. Reported (Dean, 1961) as a rare escape; OCP. No specimens have been seen by the writer.

#### 43. RHAMNACEAE

- |  |       |                     |
|--|-------|---------------------|
| 1. Leaves opposite   | ----- | 4. <i>Sageretia</i> |
| 1. Leaves alternate  | ----- | 2                   |
| 2. Plant a vine, climbing by twining   | ----- | 1. <i>Berchemia</i> |
| 2. Plant a shrub or tree   | ----- | 3                   |
| 3. Inflorescences terminal   | ----- | 2. <i>Ceanothus</i> |
| 3. Inflorescences axillary   | ----- | 4                   |
| 4. Stem spiny; sepals shorter than petals; fruit more than 2 cm long                   | ----- | 5. <i>Zizyphus</i>  |
| 4. Stem unarmed; sepals longer than petals or petals absent; fruit less than 2 cm long | ----- | 3. <i>Rhamnus</i>   |

##### 1. *Berchemia* Necker, RATTAN VINE

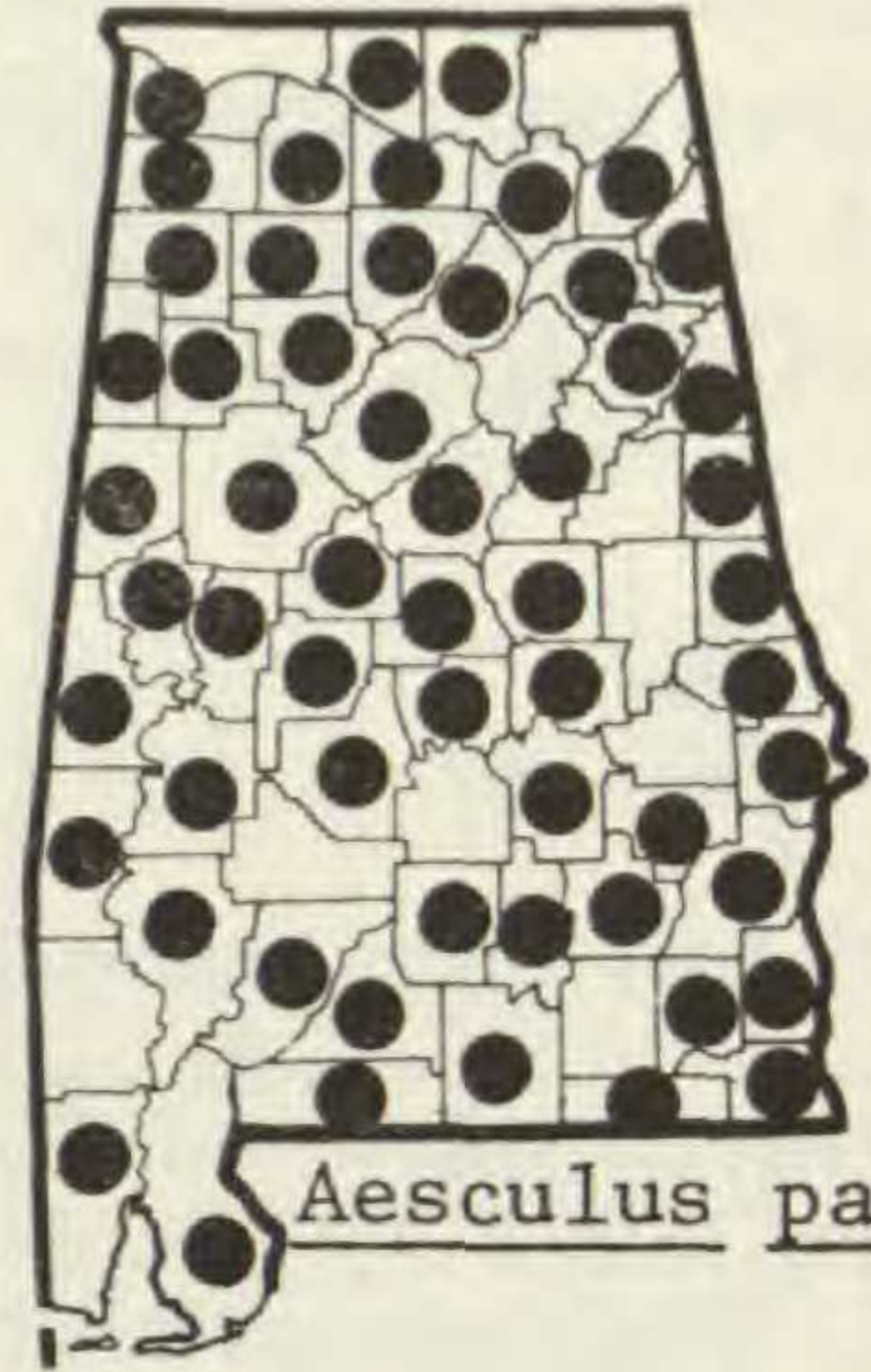
1. *B. scandens* (Hill) K. Koch. Spring; summer-fall. Thickets, fencerows, low or upland woods; CP, P (rare), VR, CuP (rare), HR.



Aesculus octandra



Aesculus parviflora



Aesculus pavia

42. SAPINDACEAE

43. RHAMNACEAE



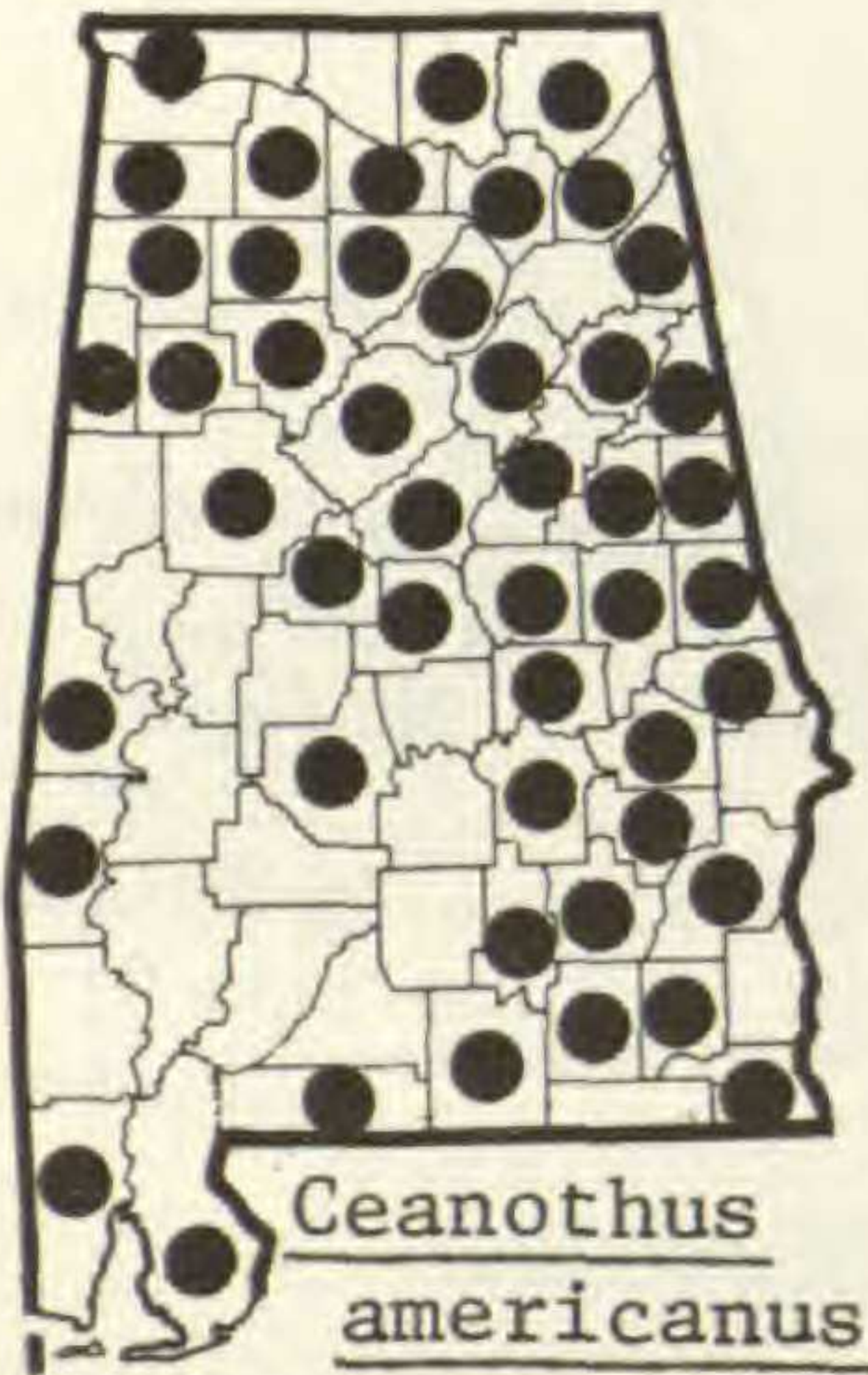
Aesculus sylvatica



Sapindus marginatus



Berchemia scandens



Ceanothus americanus



Ceanothus microphyllus



Rhamnus caroliniana



2. *Ceanothus* L.

1. Leaves crenate ..... 1. *C. americanus*  
 1. Leaves entire, occasionally remotely toothed ..... 2. *C. microphyllus*

1. *C. americanus* L., NEW JERSEY TEA. Spring-early summer; summer. Upland woods, rights-of-way, clearings; throughout, but rare in southwestern CP. *C. americanus intermedius* (Pursh) T. & G.—M; *C. intermedius* Pursh, *C. pubescens* (T. & G.) Rydb.—S.

2. *C. microphyllus* Michaux. Sandy ground, rare; eastern OCP.

3. *Rhamnus* L., BUCKTHORN

1. Leaves crenate-serrulate; calyx lobes, petals and stamens 5 ..... 1. *R. caroliniana*  
 1. Leaves regularly serrulate; calyx lobes, petals and stamens 4 ..... 2. *R. lanceolata*

1. *R. caroliniana* Walter. Spring; late summer-fall. Rich woods, usually in circumneutral soil; throughout, but rare in southern CP.

2. *R. lanceolata* Pursh. Flowers, fruit not seen in Alabama. Rich woods, apparently in circumneutral soil, very rare; CP.

4. *Sagerretia* Brongniart

1. *S. minutiflora* (Michaux) Trelease. Flowers, mature fruit not seen. Beaches, rare; OCP.

5. *Zizyphus* Gaertner, JUJUBE

1. *Z. vulgaris* Lamarck. Flowers, fruit not seen. Reported as escaped by Mohr (1901); OCP.

## 44. VITACEAE

1. Leaves, at least some, compound, 2- or more-foliolate ..... 2  
 2. Leaflets 3 or less ..... 2. *Cissus*  
 2. Leaflets 5 or more ..... 3  
 3. Leaves palmately compound; tendrils with terminal adhesive discs ..... 3. *Parthenocissus*  
 3. Leaves pinnately or bipinnately compound; tendrils lacking adhesive discs ..... 1. *Ampelopsis*  
 1. Leaves simple ..... 4  
 4. Pith of young branches interrupted at node ..... 4. *Vitis*  
 4. Pith of young branches continuous through node ..... 5  
 5. Tendrils simple; corolla deciduous as a unit; fruit 1 cm or more in diameter, yellow when immature, purplish-black at maturity ..... 4. *Vitis*  
 5. Tendrils branched; petals separate, deciduous singly; fruit less than 1 cm in diameter, white when immature, bright blue at maturity ..... 1. *Ampelopsis*

1. *Ampelopsis* Michaux

1. Leaves decomposed ..... 1. *A. arborea*  
 1. Leaves simple ..... 2. *A. cordata*

1. *A. arborea* (L.) Koehne. Spring-summer; summer-fall. Fencerows, ditches, low woods; CP, VR, HR. *A. arborea* (L.) Rusby—M, H, S.

2. *A. cordata* Michaux. Spring-summer; late summer. Fencerows, thickets, low woods, in circumneutral soil; CP, VR, CuP, HR.



Rhamnus lanceolata

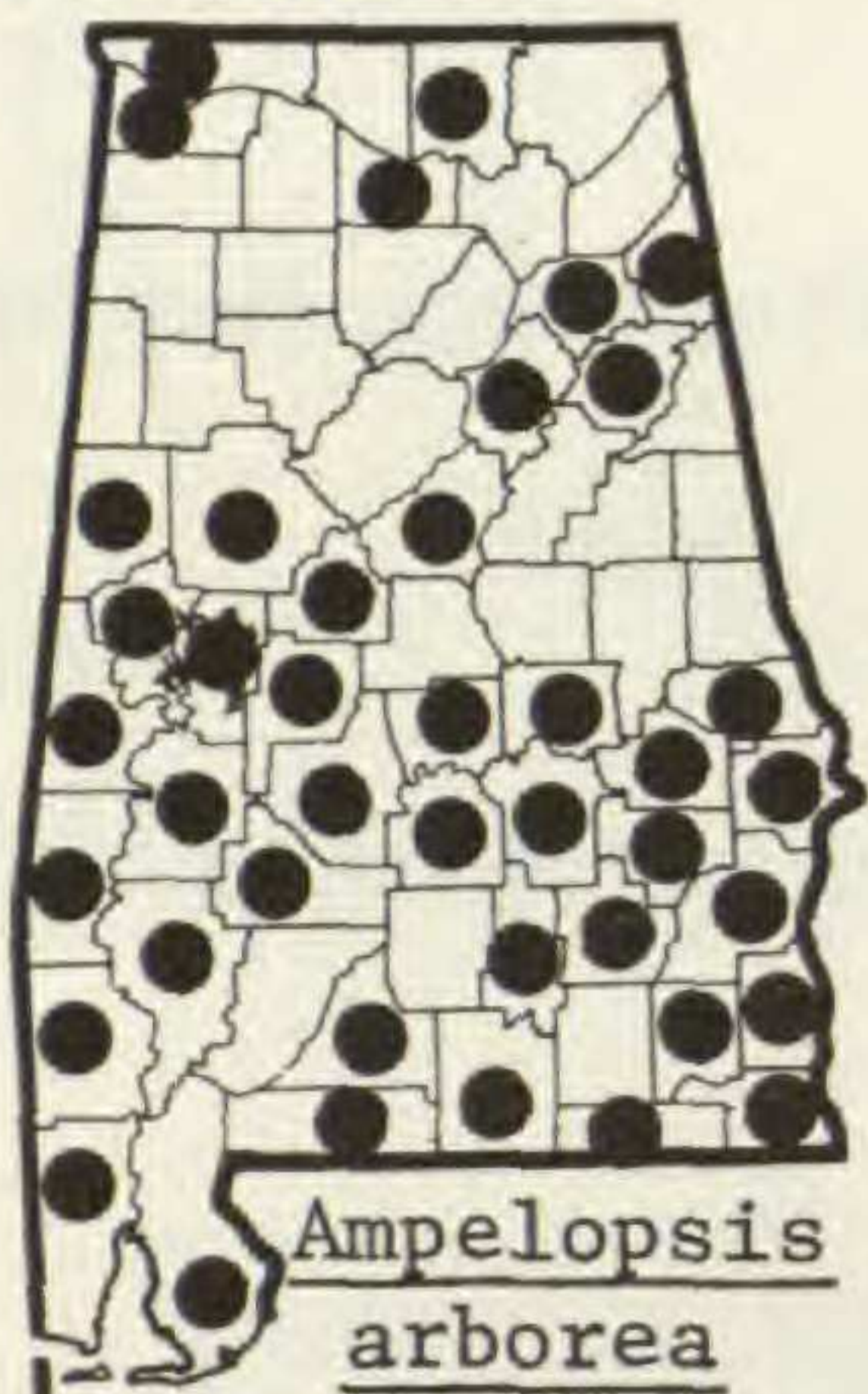


Sageretia minutiflora



Zizyphus vulgaris

44. VITACEAE



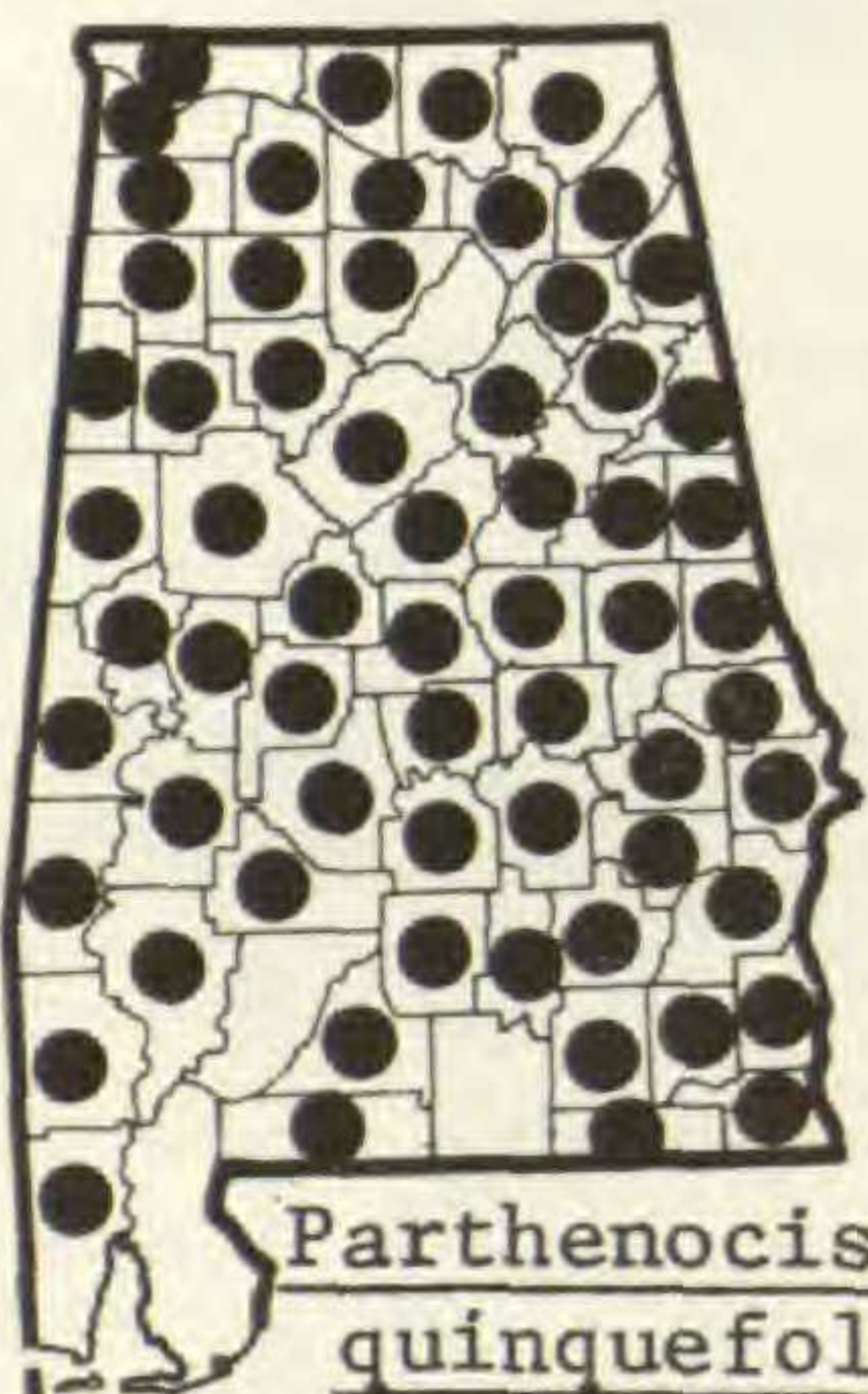
Ampelopsis arborea



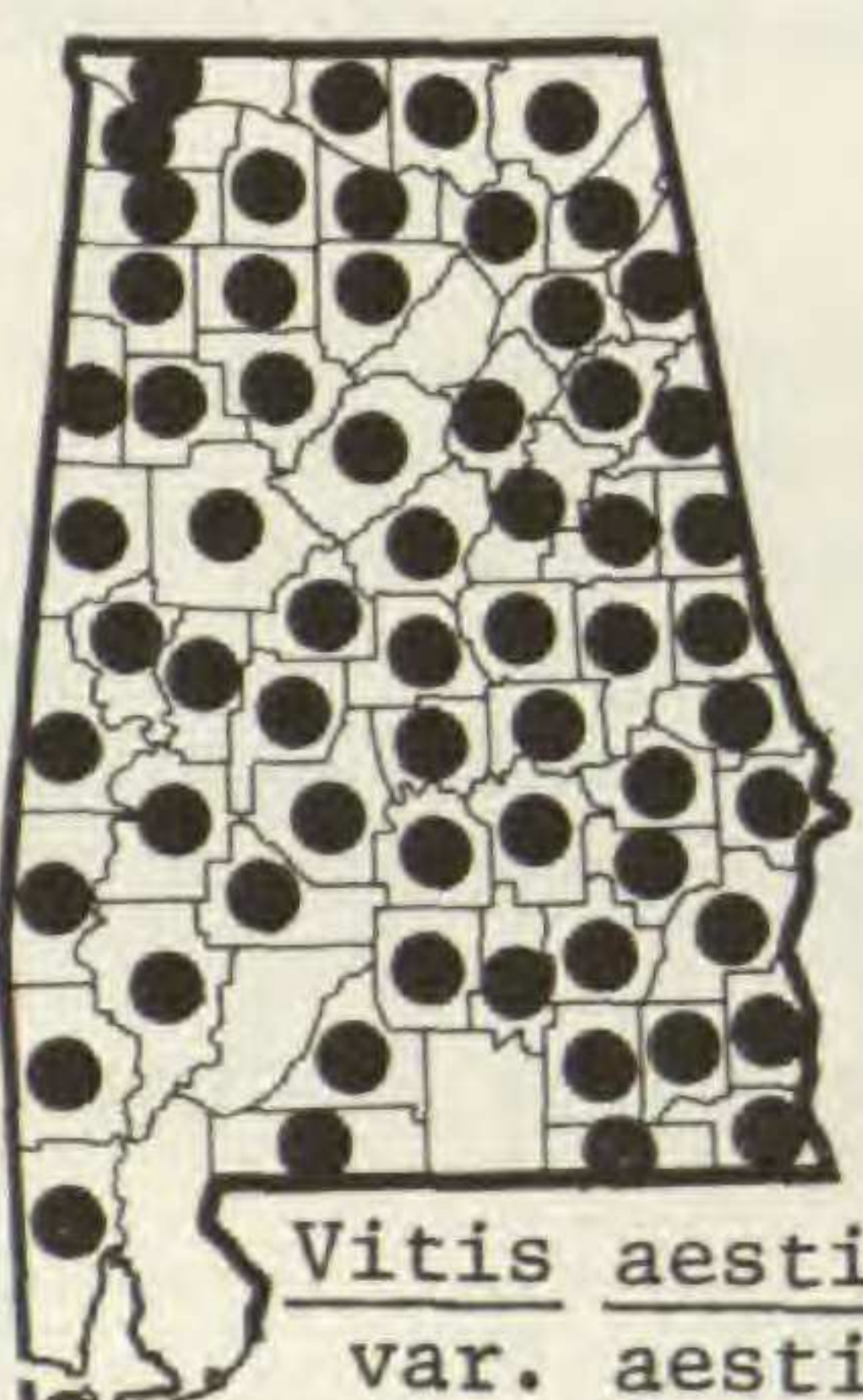
Ampelopsis cordata



Cissus incisa



Parthenocissus quinquefolia



Vitis aestivalis  
var. aestivalis



Vitis aestivalis  
var. argentifolia

2. *Cissus* L.

1. *C. incisa* (Nuttall) Des Moulins. Flowers, fruit not seen in Alabama. Dunes, rare; OCP. *C. incisa* Desmoul.—S; *Ampelopsis incisa* (Nutt.) Desmoul.—M.

3. *Parthenocissus* Planchon, VIRGINIA CREEPER

1. *P. quinquefolia* (L.) Planchon. Spring—early summer; summer—fall. Fence-rows, waste places, woods; throughout.

4. *Vitis* L., GRAPE

- |   |                           |
|---|---------------------------|
| 1. Pith of young branches continuous through the nodes .....  | 7. <i>V. rotundifolia</i> |
| 1. Pith of young branches interrupted at the nodes .....  | 2                         |
| 2. Lower surfaces of leaves entirely obscured by dense pubescence .....   | 3                         |
| 3. Abaxial leaf pubescence distinctly rusty-tawny .....   | 3. <i>V. labrusca</i>     |
| 3. Abaxial leaf pubescence not rusty-tawny .....  | 4. <i>V. mustangensis</i> |
| 2. Lower surfaces of leaves not entirely obscured by dense pubescence, or if obscured, then the pubescence floccose ..... | 4                         |
| 4. Young twigs angled .....   | 2. <i>V. cinerea</i>      |
| 4. Young twigs terete or subterete .....  | 5                         |
| 5. Leaves not greenish beneath, but tomentose or floccose .....   | 1. <i>V. aestivalis</i>   |
| 5. Leaves greenish, glabrous or glabrate beneath .....  | 6                         |
| 6. Leaves unlobed, or lateral lobes not prominent .....   | 8. <i>V. vulpina</i>      |
| 6. Leaves obviously 3-lobed .....   | 7                         |
| 7. Mature twigs of current season green, gray or brown .....  | 6. <i>V. riparia</i>      |
| 7. Mature twigs of current season red to purplish-red .....   | 5. <i>V. palmata</i>      |

1. *V. aestivalis* Michaux, SUMMER G. Spring; late summer—fall.

- |   |   |
|---|---|
| 1. Leaves not strongly glaucous beneath ..... | <i>V. aestivalis</i> var. <i>aestivalis</i>   |
| 1. Leaves strongly glaucous beneath .....     | <i>V. aestivalis</i> var. <i>argentifolia</i> |

*V. aestivalis* Michaux var. *aestivalis*. Mixed woods, often rocky; throughout.

*V. aestivalis* Michaux var. *argentifolia* (Munson) Fernald. Low or rocky woods, infrequent; CP, AM, CuP. *V. bicolor* LeConte—M, H, S.

2. *V. cinerea* Engelm. Late spring; fall. Low woods, local; CP, CuP, HR.

3. *V. labrusca* L., Fox G. Spring; late summer—fall. Upland fencerows, woods, very rare; P, AM, CuP.

4. *V. mustangensis* Buckley. Flowers, fruit not seen. Calcareous soil, very rare; CP.

5. *V. palmata* Vahl. Flowers, fruit not seen. Alluvial woods, rare; western CP.

6. *V. riparia* Michaux. Spring; late summer—fall. Roadsides, upland and low woods; throughout, but rare or absent in southern CP and very rare on CuP.

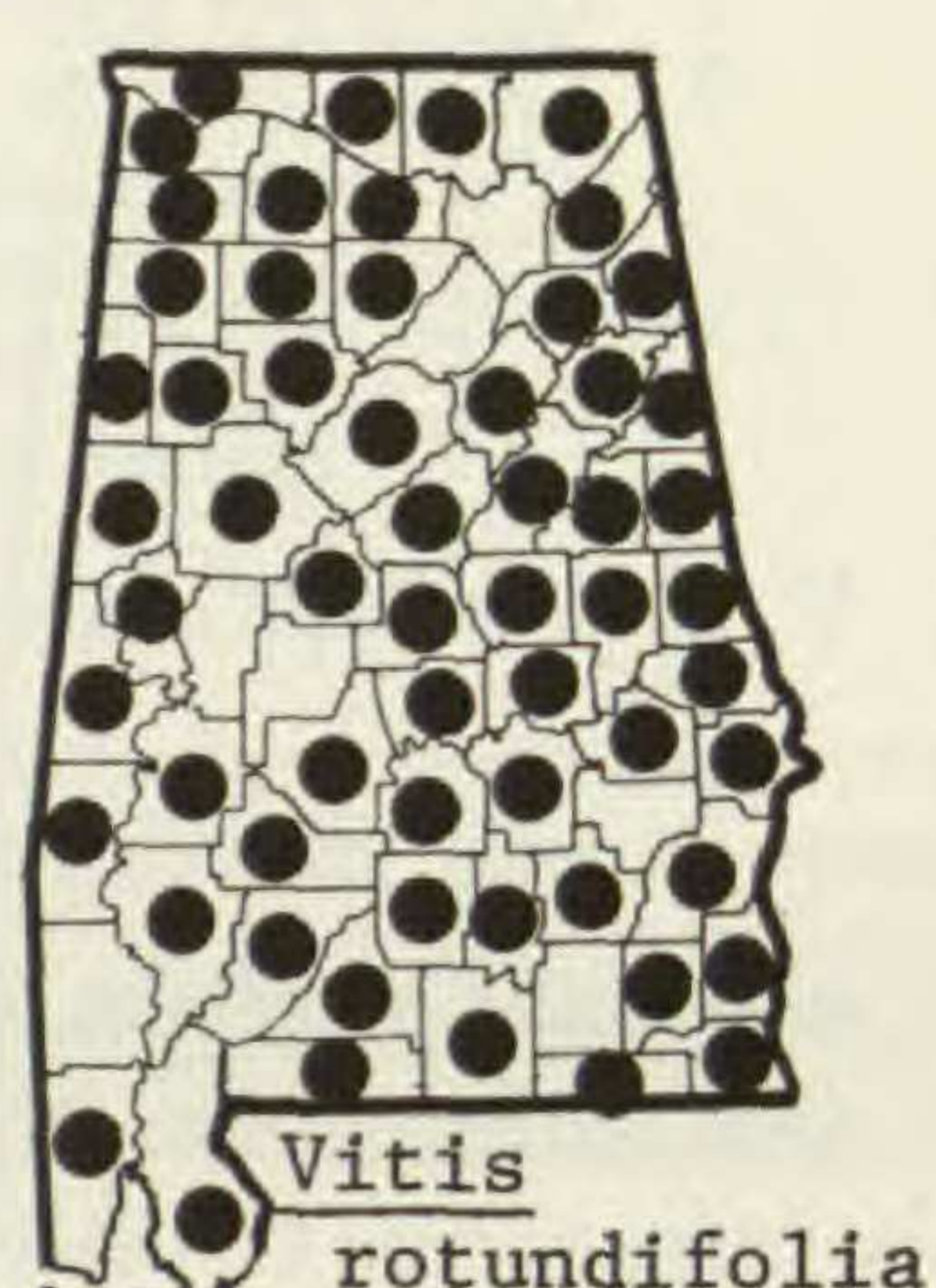
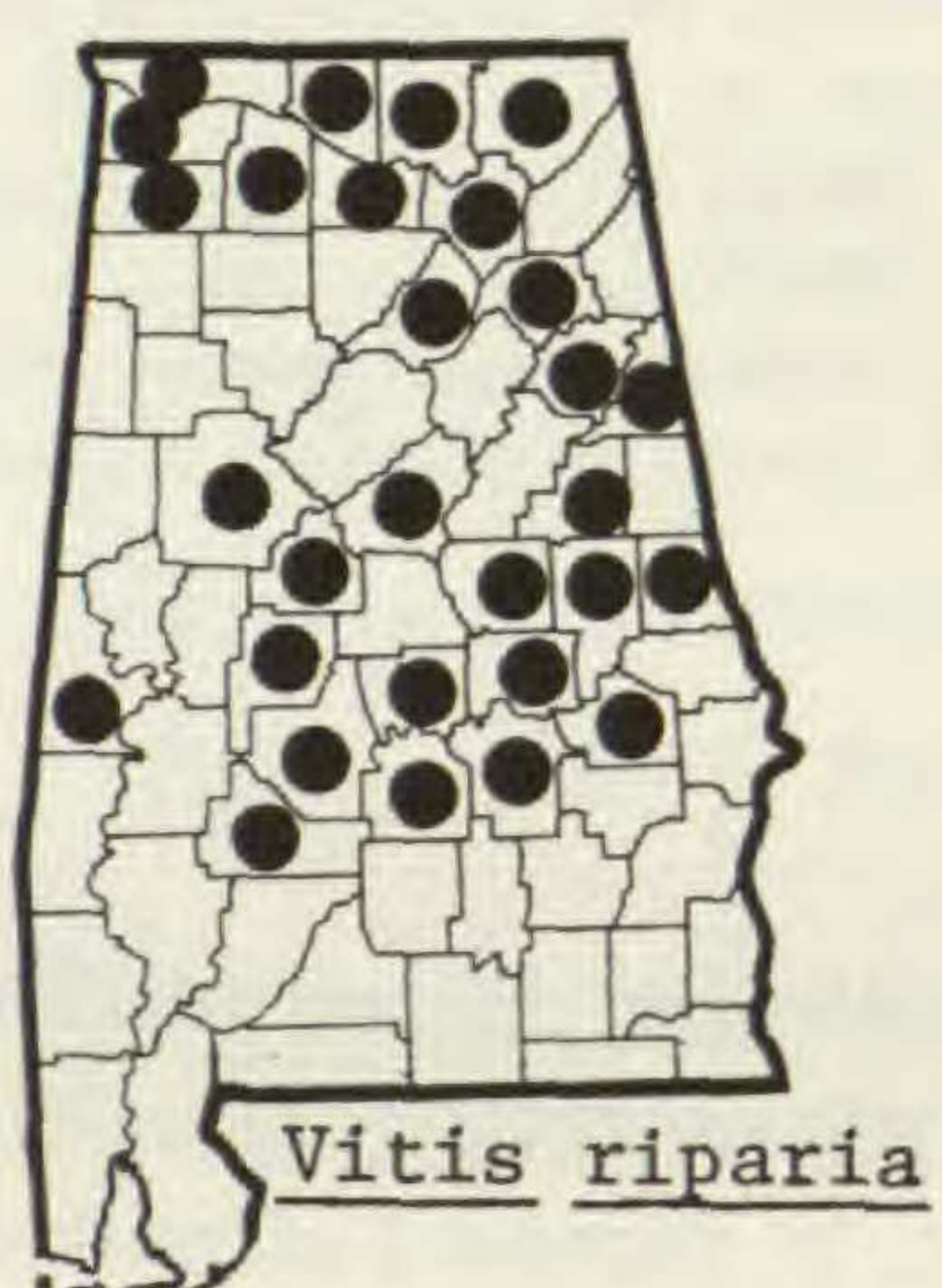
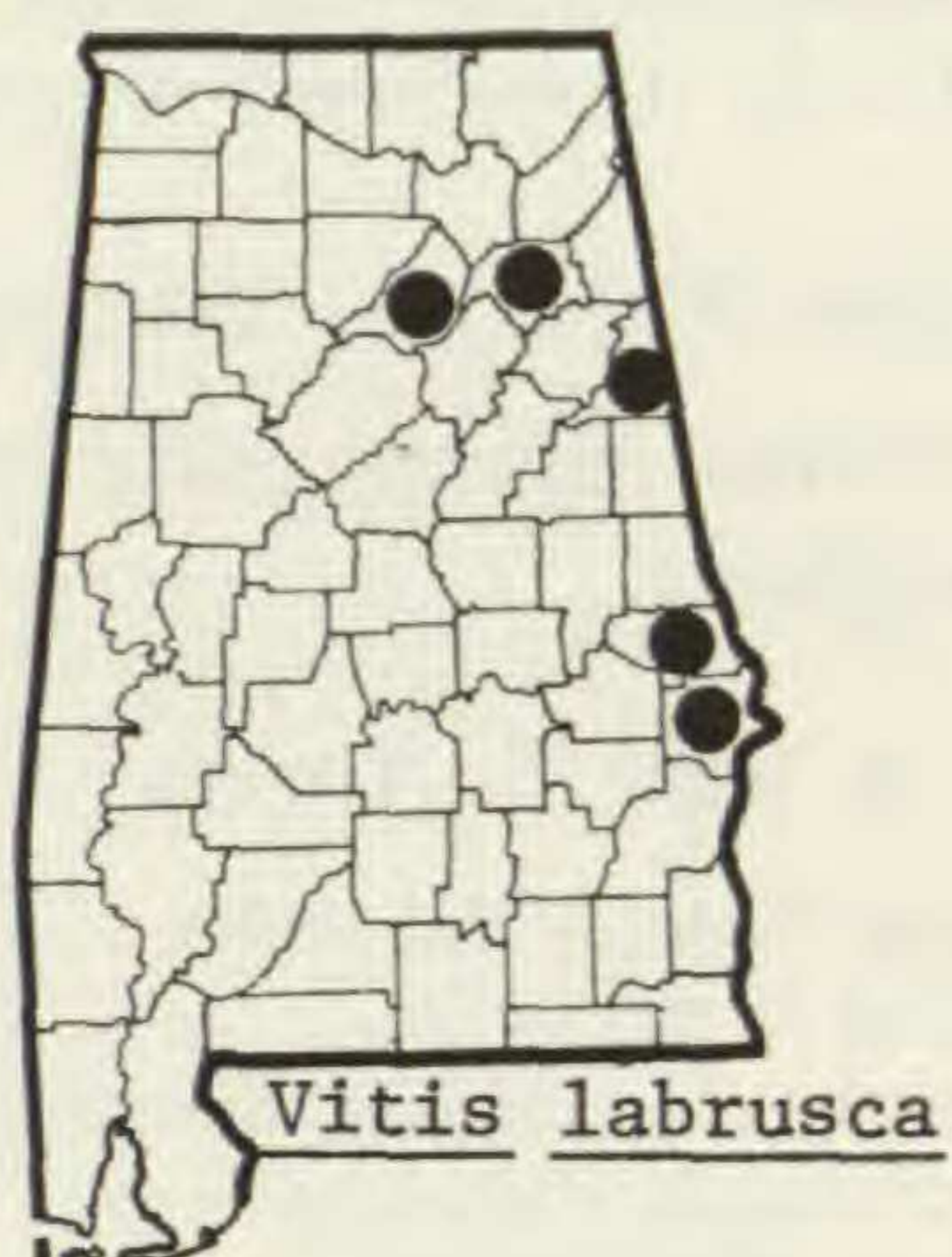
7. *V. rotundifolia* Michaux, MUSCADINE G. Spring; late summer—fall. Upland woods, thickets, fencerows, throughout. *Muscadina rotundifolia* (Michx.) Sm.—S.

8. *V. vulpina* L. Spring; late summer—fall. Low woods; throughout. *V. cordifolia* Lam.—M, H, S; *V. baileyana* Munson—S, RAB.

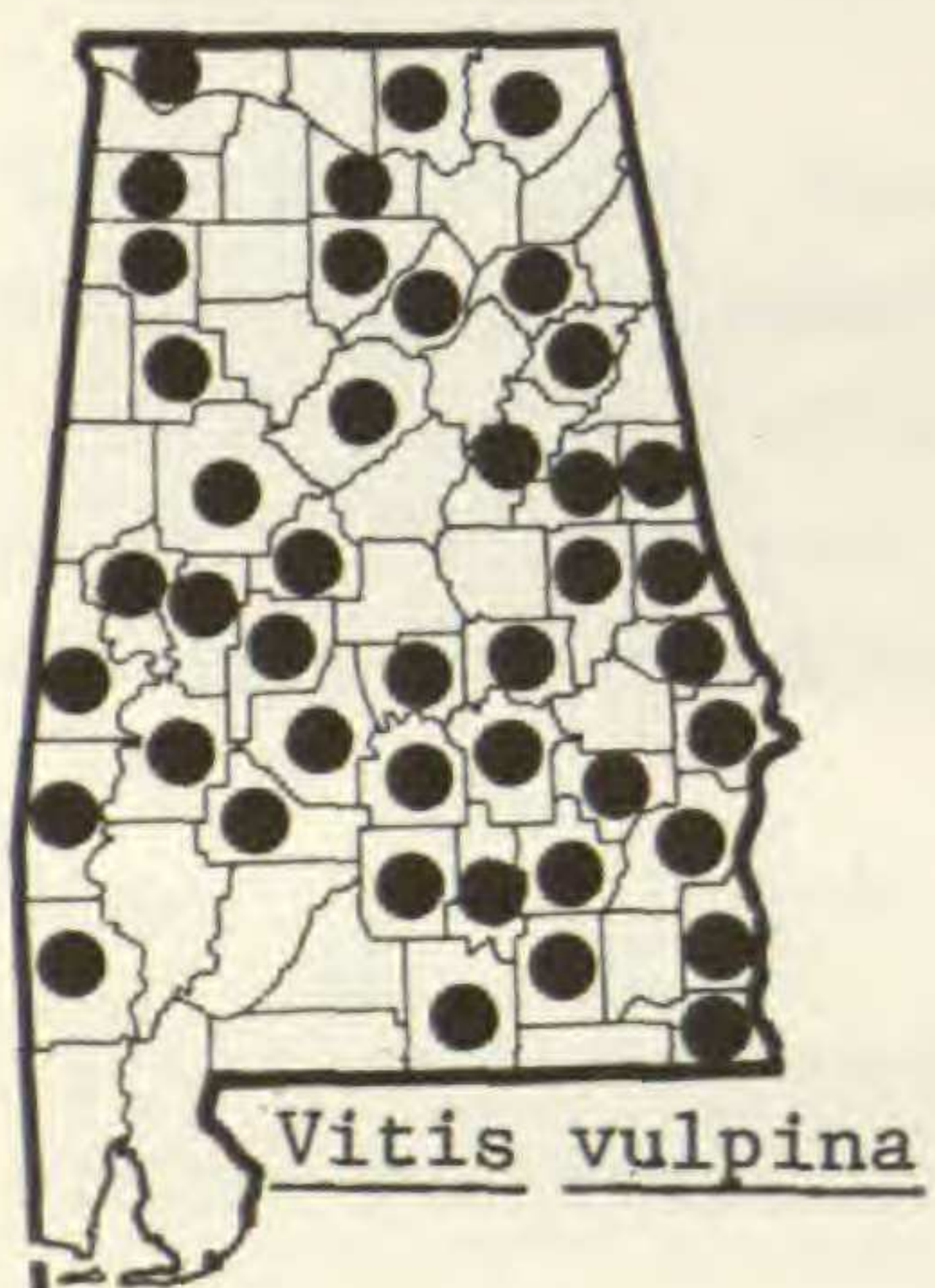
## 45. TILIACEAE

1. *Tilia* L., BASSWOOD, LINN, LINDEN

1. *Tilia americana* L., complex. Late spring—early summer; summer. Mesic or rich woods, bluffs; throughout. *T. heterophylla* Vent.—M, H, S, RAB; *T. caro-*



## 45. TILIACEAE



## 46. MALVACEAE



*liniana* Mill.—S, RAB; *T. floridana* Sm.—H, S, RAB; *T. neglecta* Spach—H, S; *T. michauxii* Nutt.—S; *T. leucocarpa* Ashe, *T. australis* Sm.—H, S; *T. leucocarpa glaucescens* (Sarg.) Bush, *T. floridana alabamensis* Ashe, *T. lata* Ashe, *T. heterophylla michauxii* (Nutt.) Sarg., *T. heterophylla amphibola* Sarg.—H.—A very polymorphic group. For a recent treatment, see Jones (1968).

## 46. MALVACEAE

1. *Hibiscus* L.

1. *H. syriacus* L., ALTHEA, ROSE OF SHARON. Late spring–summer; summer–fall. Escaped to waste places, rare; CP, VR.

## 47. STERCULIACEAE

1. *Firmiana* Marsili

1. *F. platanifolia* (L. f.) Marsili, JAPANESE VARNISH TREE. Late spring–summer; summer. Escaped to woodlots, rare; CP. *F. platanifolia* (L. f.) R. Br.—H.

## 48. THEACEAE

1. Leaves evergreen; sepals very unequal ..... 1. *Gordonia*  
1. Leaves deciduous; sepals subequal ..... 2. *Stewartia*

1. *Gordonia* Ellis

1. *G. lasianthus* (L.) Ellis. Summer; summer–fall. Low ground, very rare; OCP.

2. *Stewartia* L.

1. Styles united; seeds wingless ..... 1. *S. malacodendron*  
1. Styles distinct; seeds winged ..... 2. *S. ovata*

1. *S. malacodendron* L. Late spring–early summer; summer–fall. Mesic or rich woods, local; CP, CuP.

2. *S. ovata* (Cavanilles) Weatherby. Summer; summer–fall. Bluffs, stream-banks, infrequent; CuP. *S. pentagyna* L'Her—M, H; *Malacodendron pentagynum* (L'Her) Sm.—S.

## 49. HYPERICACEAE

1. *Hypericum* L., ST. JOHN'S WORT

The following treatment is adapted from that of W. P. Adams (1962).

1. Leaves clasping ..... 9. *H. myrtifolium*  
1. Leaves not clasping ..... 2  
2. Mature leaves and sepals not needle-like, usually over 2 mm wide ..... 3  
3. Perianth tetramerous ..... 4  
4. Gynoecium 2-carpellate, 2-styled ..... 5  
5. Pedicels elongate; bracts subtending flowers at base of pedicels ..... 16. *H. suffruticosum*  
5. Pedicels compact; bracts subtending flowers approximate to the sepals ..... 6  
6. Plant erect ..... 7. *H. hypericoides*  
6. Plant decumbent ..... 15. *H. stragalum*  
4. Gynoecium 3-carpellate, 3-styled ..... 14. *H. stans*

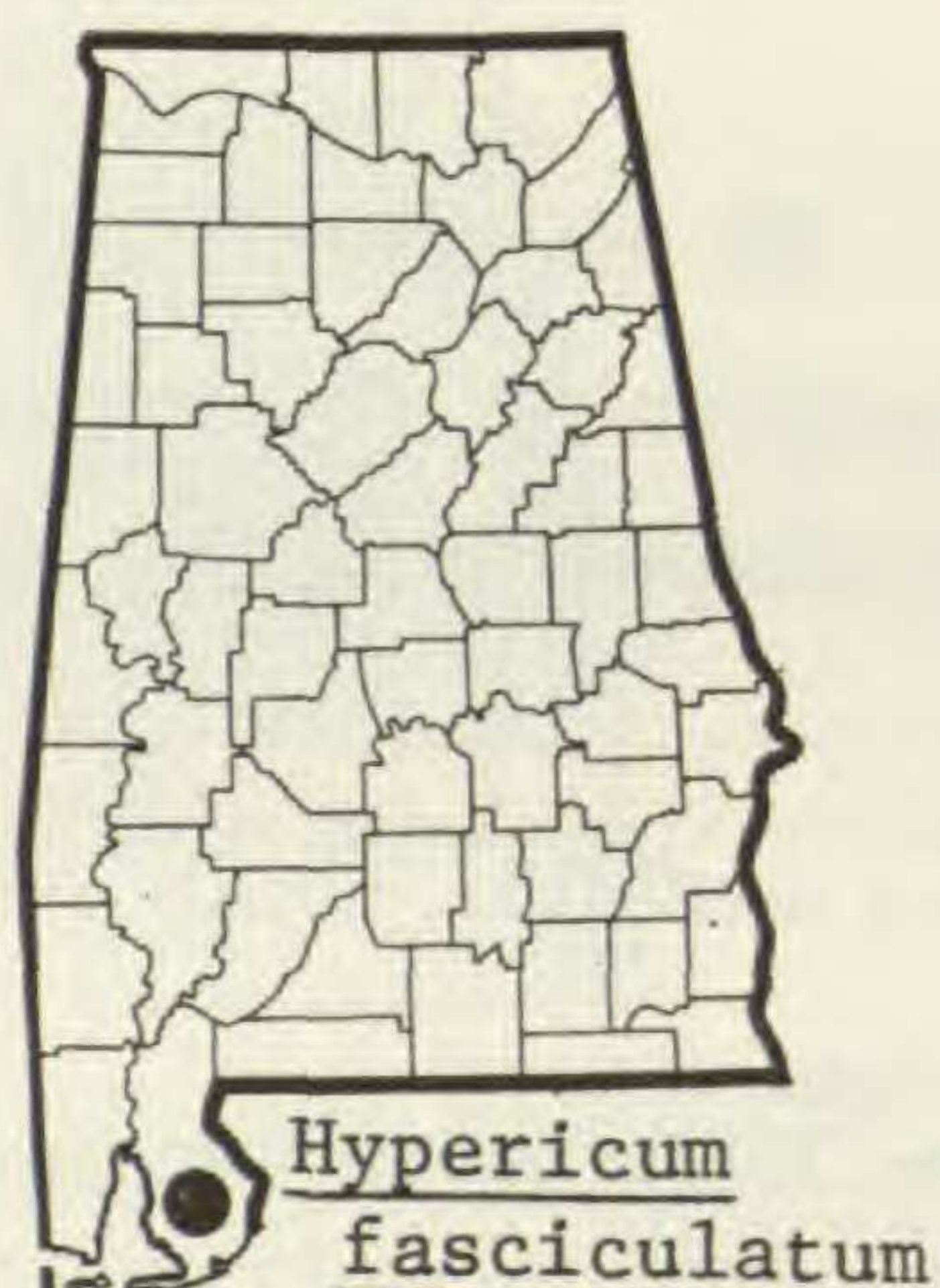
47. STERCULIACEAE



48. THEACEAE



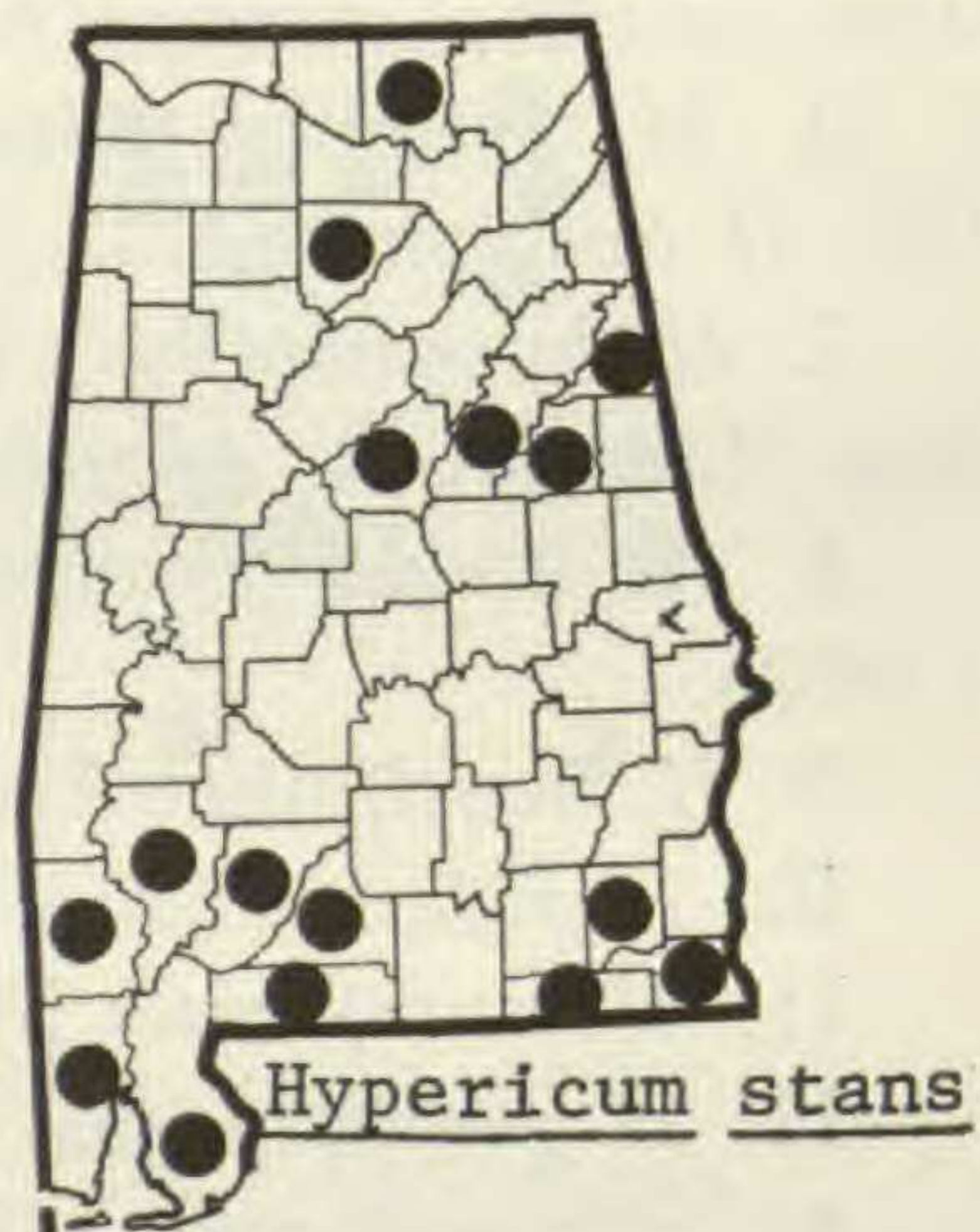
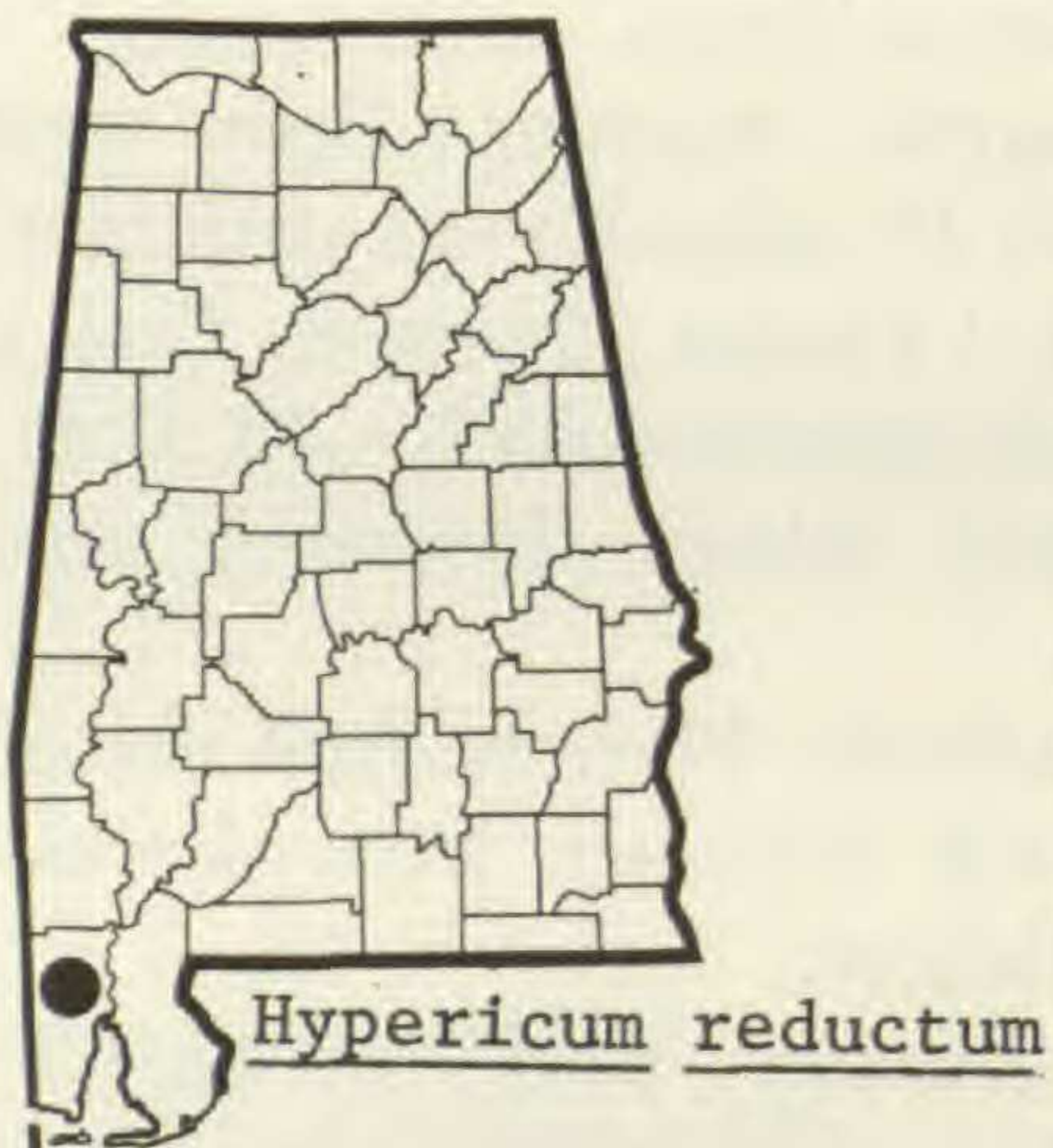
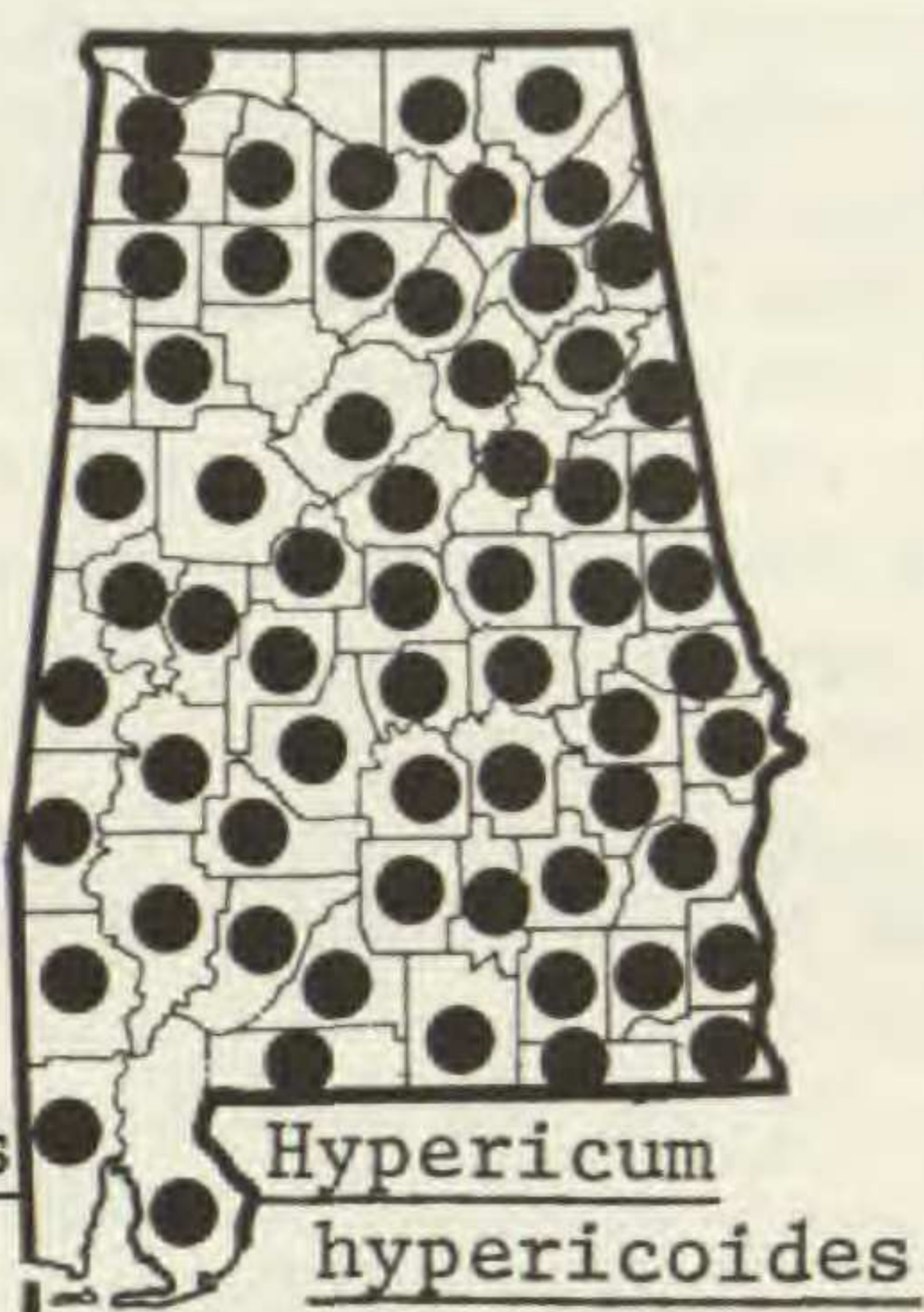
49. HYPERICACEAE



3. Perianth pentamerous; gynoecia predominantly 3-carpellate and 3-styled ..... 7
7. Inflorescences, at least most, less than 3-flowered ..... 5. *H. frondosum*
7. Inflorescences predominantly more than 3-flowered ..... 8
8. Leaves and sepals without a basal articulation or groove ..... 9
9. Stamens less than 55; seeds less than 0.8 mm long ..... 2. *H. cistifolium*
9. Stamens more than 75; seeds more than 1.2 mm long ..... 11. *H. nudiflorum*
8. Leaves and sepals with a basal articulation or groove ..... 10
10. Largest leaves 1.5–3.0 cm long; seeds 0.7–0.8 mm long ..... 6. *H. galioides*
10. Largest leaves 3.0 cm long or longer; seeds more than 0.8 mm long ..... 11
11. Mature capsules less than 6 mm long and 3 mm broad; seeds reddish-brown; leaves linear or narrowly elliptic ..... 3. *H. densiflorum*
11. Mature capsules more than 7.5 mm long and 3.5 mm broad; seeds dark brown or black; leaves elliptic or wider ..... 12. *H. prolificum*
2. Mature leaves and sepals needle-like, less than 2 mm wide (*H. fasciculatum* complex) ..... 12
12. Largest leaves regularly less than 11 mm long ..... 13
13. Plant decumbent ..... 13. *H. reductum*
13. Plant erect ..... 1. *H. brachyphyllum*
12. Largest leaves regularly more than 13 mm long ..... 14
14. Plant decumbent ..... 8. *H. lloydii*
14. Plant erect ..... 15
15. Bark spongy, exfoliating in thin sheets; 1- to 3-flowered inflorescences present in upper 1 or 2 leaf axils ..... 4. *H. fasciculatum*
15. Bark thin, exfoliating in flakes or narrow strips; many-flowered inflorescences present in upper 3–7 leaf axils ..... 10. *H. nitidum*

Dates given below are for flowering season only, as fruits are usually persistent.

1. *H. brachyphyllum* (Spach) Steudel. Summer. Ditches, low pinelands, OCP. Closely related to species 4, 10, 13.
2. *H. cistifolium* Lamarck. Summer. Swamp ecotones; OCP. *H. opacum* T. & G.—M, H, S.
3. *H. densiflorum* Pursh. Summer. Low open stream borders, infrequent; southern CuP, VR.
4. *H. fasciculatum* Lamarck. Summer. Low ground; OCP. Forms a complex including species 1, 10, 13. *H. aspalathoides* Willd.—M, H, S.
5. *H. frondosum* Michaux. Summer. Rocky woods, often over calcareous rock, infrequent; throughout. *H. aureum* Bartr.—M, H, S.—One of Alabama's most beautiful shrubs when in bloom.
6. *H. galioides* Lamarck. Summer. Open swamp borders, low pinelands; CP. *H. ambiguum* Ell.—S; *H. galioides* var. *pallidum* Mohr—M, H.
7. *H. hypericoides* (L.) Crantz. Summer. Low and upland woods and clearings; throughout. *Ascyrum hypericoides* L.—M, H, S.
8. *H. lloydii* (Svenson) Adams. Piedmont, rare; reported by W. P. Adams (1962).
9. *H. myrtifolium* Lamarck. Flowers, fruit not seen. Ponds; OCP.
10. *H. nitidum* Lamarck. Summer. Low pinelands, creek swamps, rare; OCP.
11. *H. nudiflorum* Michaux. Summer. Open ground, very rare; CP, VR.
12. *H. prolificum* L. Summer. Rocky woods; CP, CuP, HR.
13. *H. reductum* (Svenson) Adams. Summer. Sandy woods, rare; OCP (W. P. Adams 1962). Closely related to species 1, 4, 10.
14. *H. stans* (Michaux) Adams & Robson. Summer. Low, open ground,





thickets; OCP, P (rare), AM, CuP, VR, HR. *Ascyrum stans* Michx.—M, H, S; *A. cuneifolium* Chapm.—S.

15. *H. stragalum* Adams & Robson. Summer. Rocky woods and clearings; AM, VR, CuP, HR. *Ascyrum multicaule* Michx.—M. Closely related to species 7.

16. *H. suffruticosum* Adams & Robson. Summer. Reported from OCP by W. P. Adams (1962). *Ascyrum pumilum* Michx.—M, S.

## 50. CACTACEAE

### 1. *Opuntia* Miller, CACTUS, PRICKLY PEAR

- |  |                         |
|--|-------------------------|
| 1. Stem segments more than 1 dm long, bearing 2-3 flattened, indurate spines at some nodes; fruit more than 3 cm broad | 3. <i>O. vulgaris</i>   |
| 1. Stem segments less than 1 dm long, or indurate spines always less than 2 per node; fruit less than 2.5 cm broad     | 2                       |
| 2. Nodes, at least some, with more than 1 spine  | 2. <i>O. drummondii</i> |
| 2. Nodes with 1 or no spines   | 1. <i>O. compressa</i>  |

1. *O. compressa* (Salisbury) Macbride. Spring; summer-fall. Open, sandy or rocky ground; infrequent; throughout, but poorly collected. *O. humifusa* Raf., *O. opuntia* (L.) Coult.—M; *O. opuntia* (L.) Karst., *O. pollardi* Britt. & Rose, *O. bentonii* Griff.—S.

2. *O. drummondii* Graham. Spring; summer-fall. Dunes; OCP. *O. pes-corvi* LeConte—M; *O. tracyi* Britt.—S.

3. *O. vulgaris* Miller. Spring; summer-fall. Escaped to sandy woods and beaches; OCP.

## 51. THYMELAEACEAE

### 1. *Dirca* L., LEATHERWOOD

1. *D. palustris* L. Spring; late spring-early summer. Rich woods in circum-neutral soil, rare; CP, CuP.

## 52. ELAEAGNACEAE

### 1. *Elaeagnus* L.

1. *E. umbellata* Thunberg. Spring; summer. Escaped, rare; CuP.

## 53. LYTHRACEAE

- |  |                         |
|--|-------------------------|
| 1. Inflorescences axillary, cymose     | 1. <i>Decodon</i>       |
| 1. Inflorescences terminal, paniculate | 2. <i>Lagerstroemia</i> |

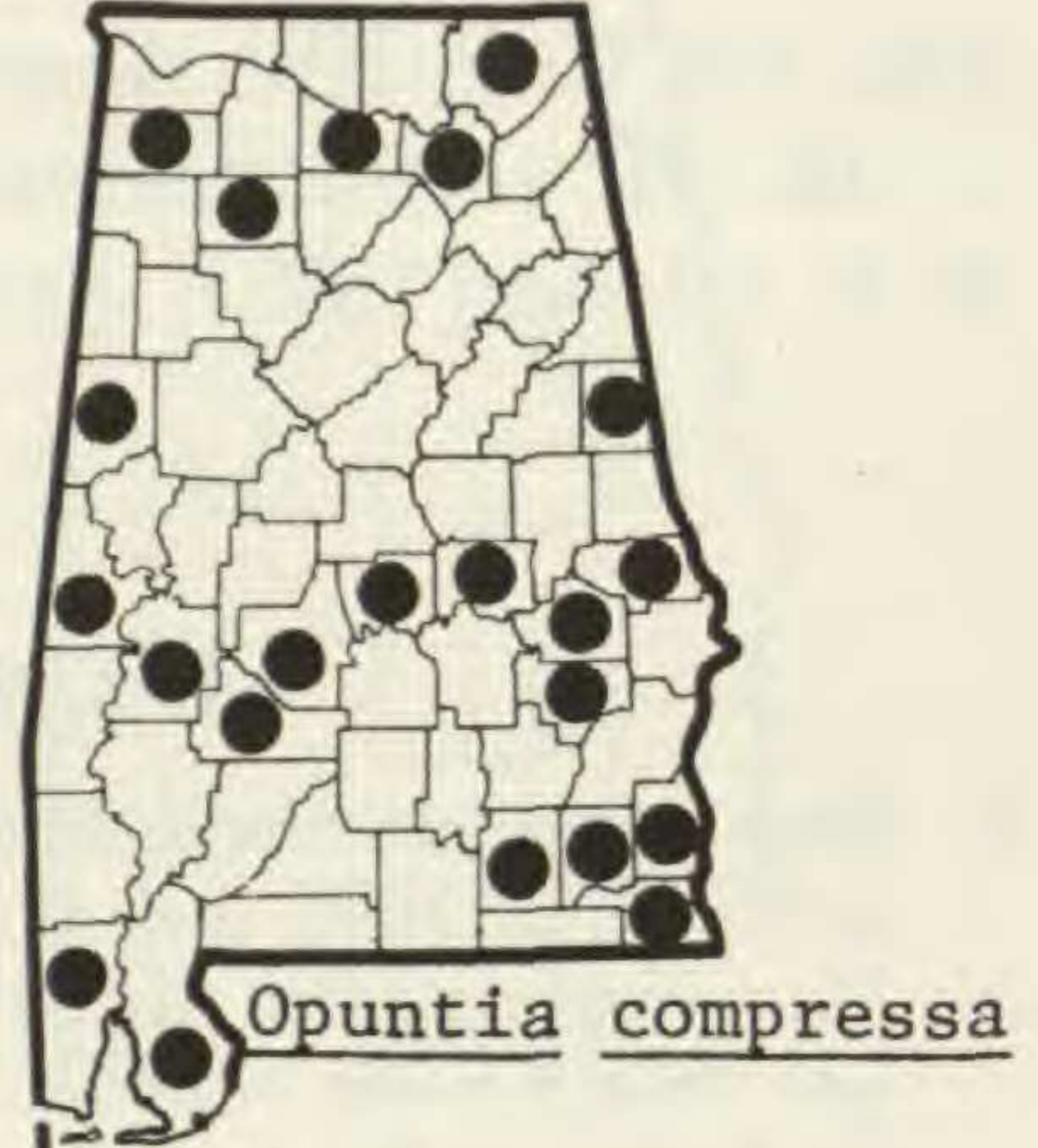
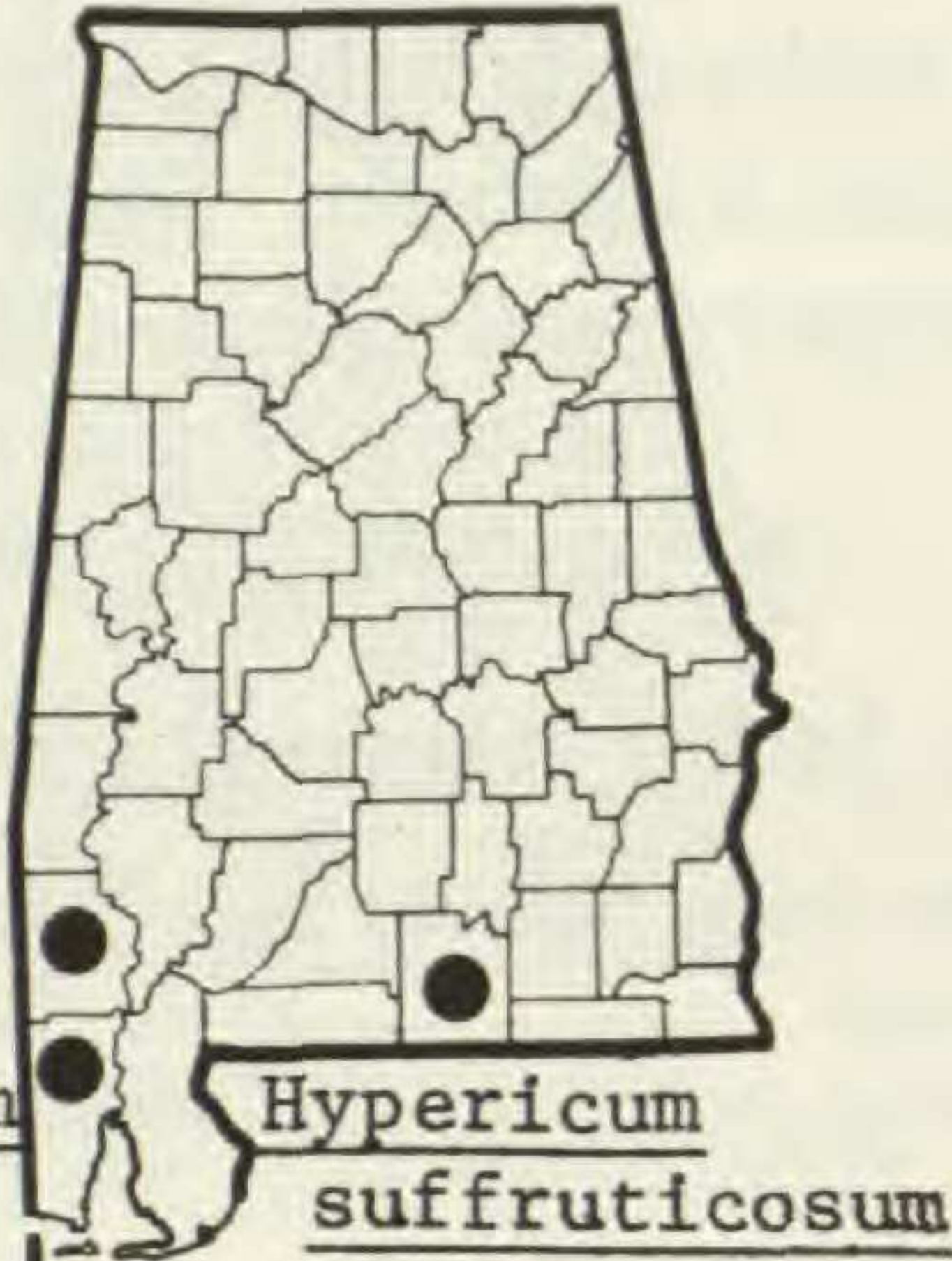
### 1. *Decodon* Gmelin

1. *D. verticillatus* (L.) Elliott. Summer. Pools, marshes; VR. Reported from CP, HR by Mohr (1901) and Harper (1928).

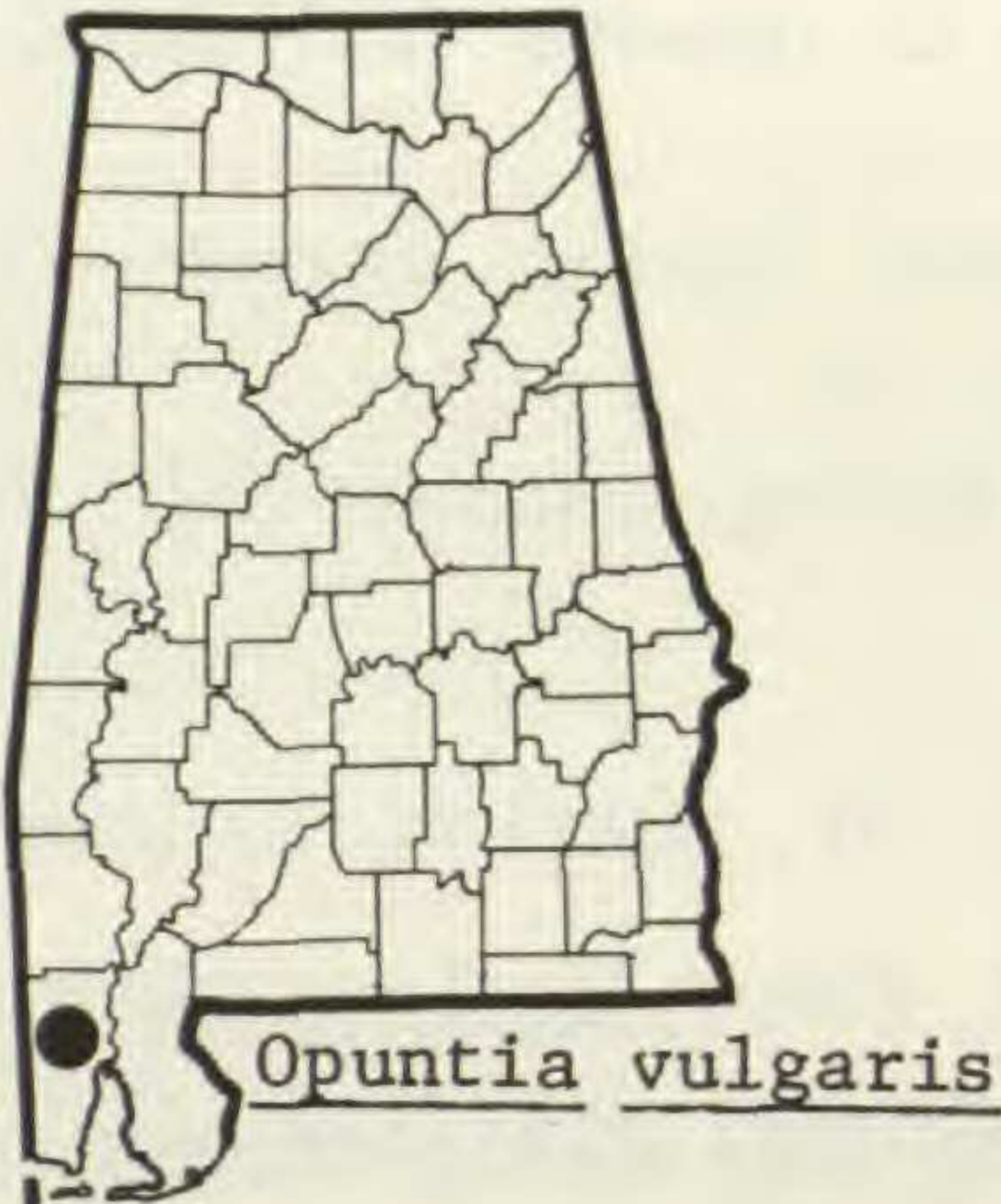
### 2. *Lagerstroemia* L.

1. *L. indica* L., CRAPE-MYRTLE. Summer; fall-winter. Persistent or rarely escaping in fencerows, waste places; principally CP.

50. CACTACEAE



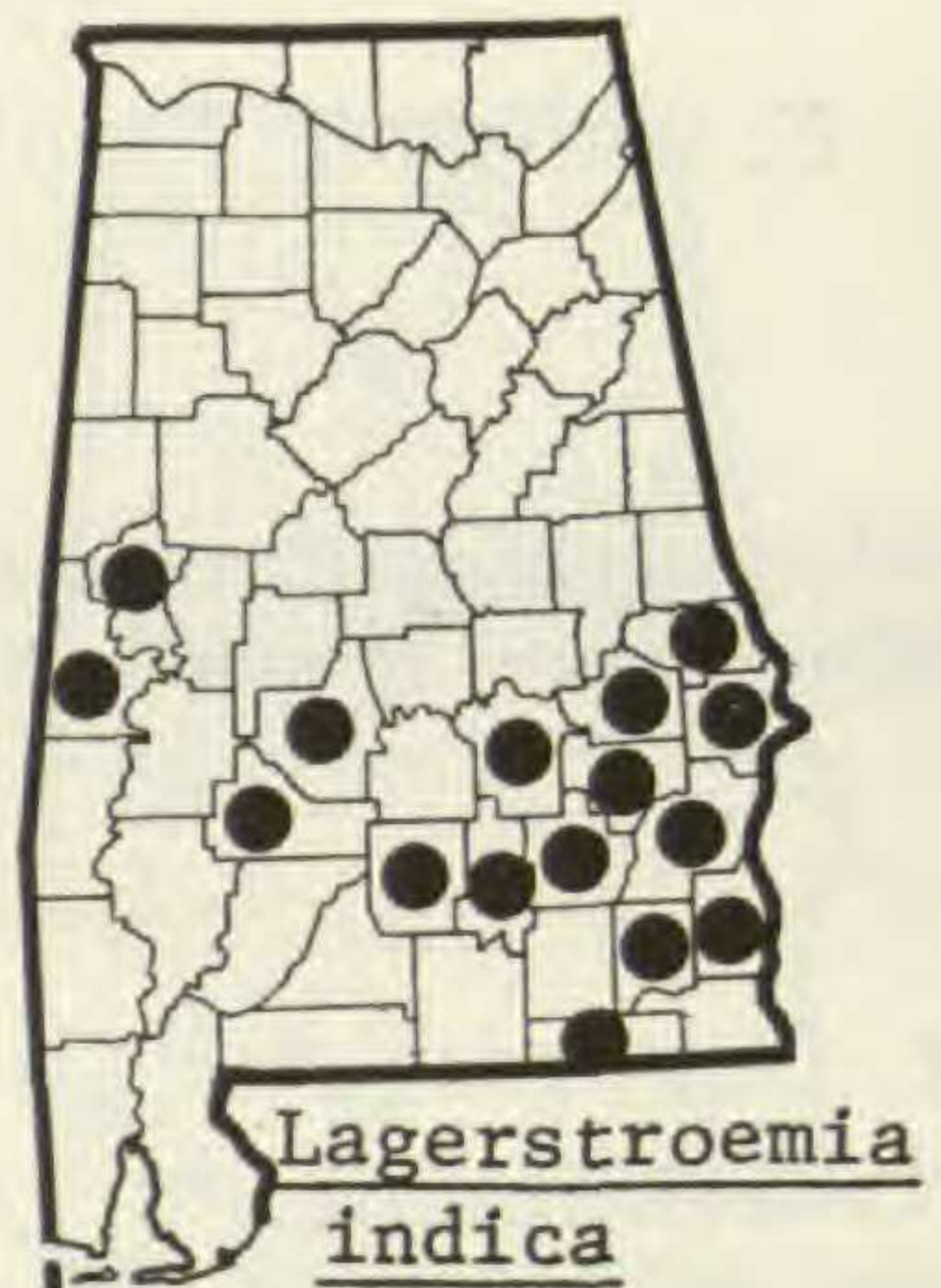
51. THYMELAEACEAE



52. ELAEAGNACEAE



53. LYTHRACEAE



## 54. ARALIACEAE

1. Leaves decomposed; plant a shrub or tree ..... 1. *Aralia*  
 1. Leaves simple; plant a vine ..... 2. *Hedera*

1. *Aralia* L.

1. *A. spinosa* L., DEVIL'S WALKING-STICK, PRICKLY ASH. Summer-fall. Mesic woods and clearings; throughout.

2. *Hedera* L., IVY

1. *H. helix* L. Summer; fall. Trash heap, very rare; CP.

## 55. NYSSACEAE

1. *Nyssa* L., GUM

1. Pistillate flowers solitary; staminate flowers sessile; drupe more than 1.5 cm long ..... 1. *N. aquatica*  
 1. Pistillate flowers in 2- or more-flowered clusters; staminate flowers pedicelled; drupe less than 1.5 cm long ..... 2. *N. sylvatica*

1. *N. aquatica* L., TUPELO G. Spring; late summer-fall. Swamp forests, stream margins; CP, CuP, VR, HR.

2. *N. sylvatica* Marshall, BLACK G. Spring; late summer-early fall. Low and upland woods, ponds, bogs; throughout. *N. biflora* Walt.—M, H, S; *N. sylvatica* var. *biflora* (Walt.) Sarg.—RAB.—This species is very wide-ranging and variable. *Nyssa biflora* Walt. appears to deserve ecotypic status.

*Nyssa ogeche* Marshall, separated from *N. aquatica* L. by obtuse leaves, red fruit, and winged endocarp, has been reported (Eyde, 1963) from the OCP, but no specimens have been seen by the writer.

## 56. CORNACEAE

1. *Cornus* L., DOGWOOD

1. Leaves alternate ..... 1. *C. alternifolia*  
 1. Leaves opposite ..... 2  
 2. Cyme head-like; bracts more than 1 cm long; drupes red ..... 4. *C. florida*  
 2. Cyme open; bracts minute or absent; drupes white to blue ..... 3  
 3. Pith of 1-year-old twigs reddish, brown or tan ..... 2. *C. amomum*  
 3. Pith of 1-year-old twigs white or cream-colored ..... 4  
 4. Leaves scabrous or scaberulous above ..... 3. *C. asperifolia*  
 4. Leaves smooth above ..... 5. *C. stricta*

1. *C. alternifolia* L. f., ALTERNATE-LEAVED D. Spring; summer-fall. Rich or low woods, rare; CP, P, CuP. *Svida alternifolia* (L. f.) Sm.—S.

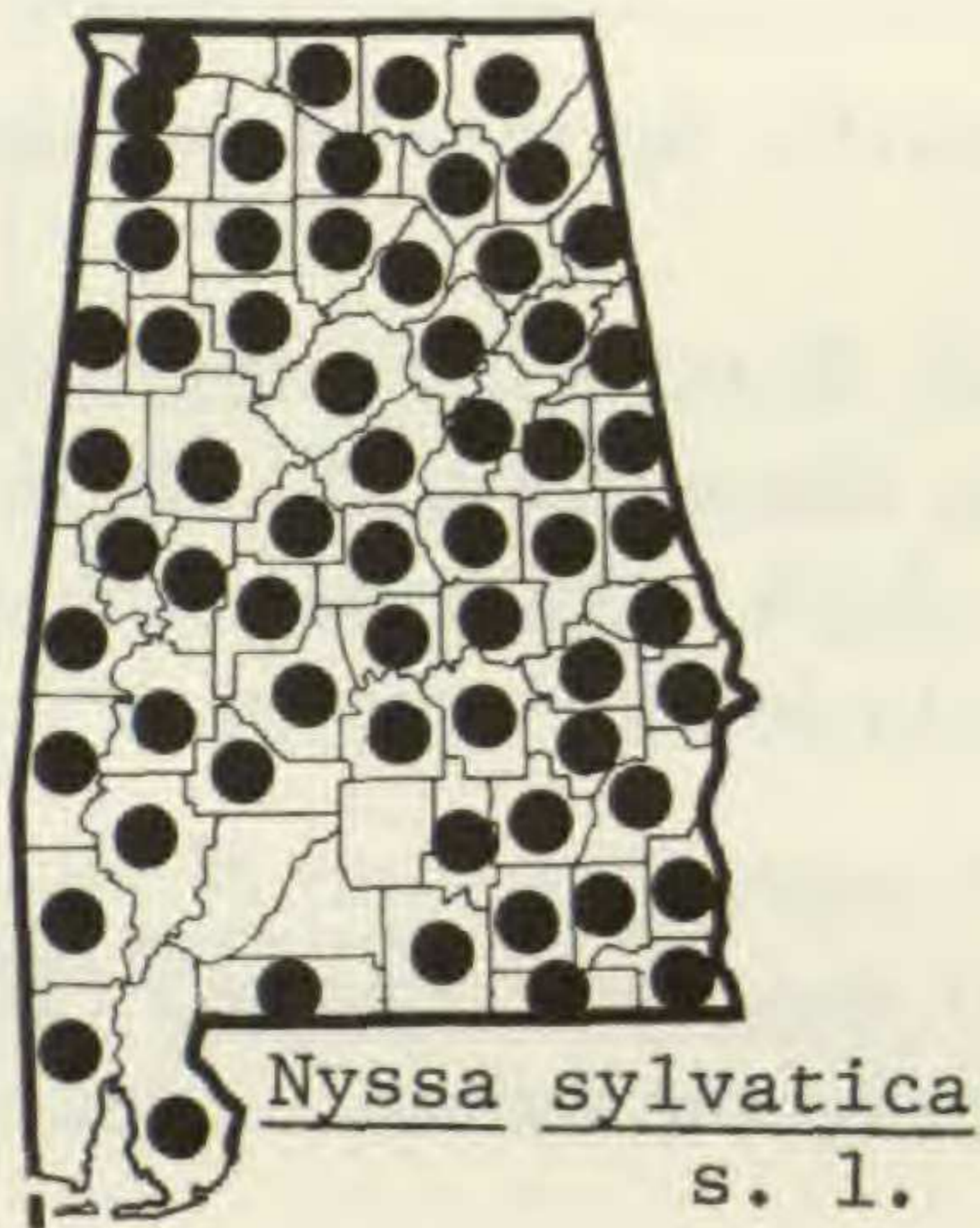
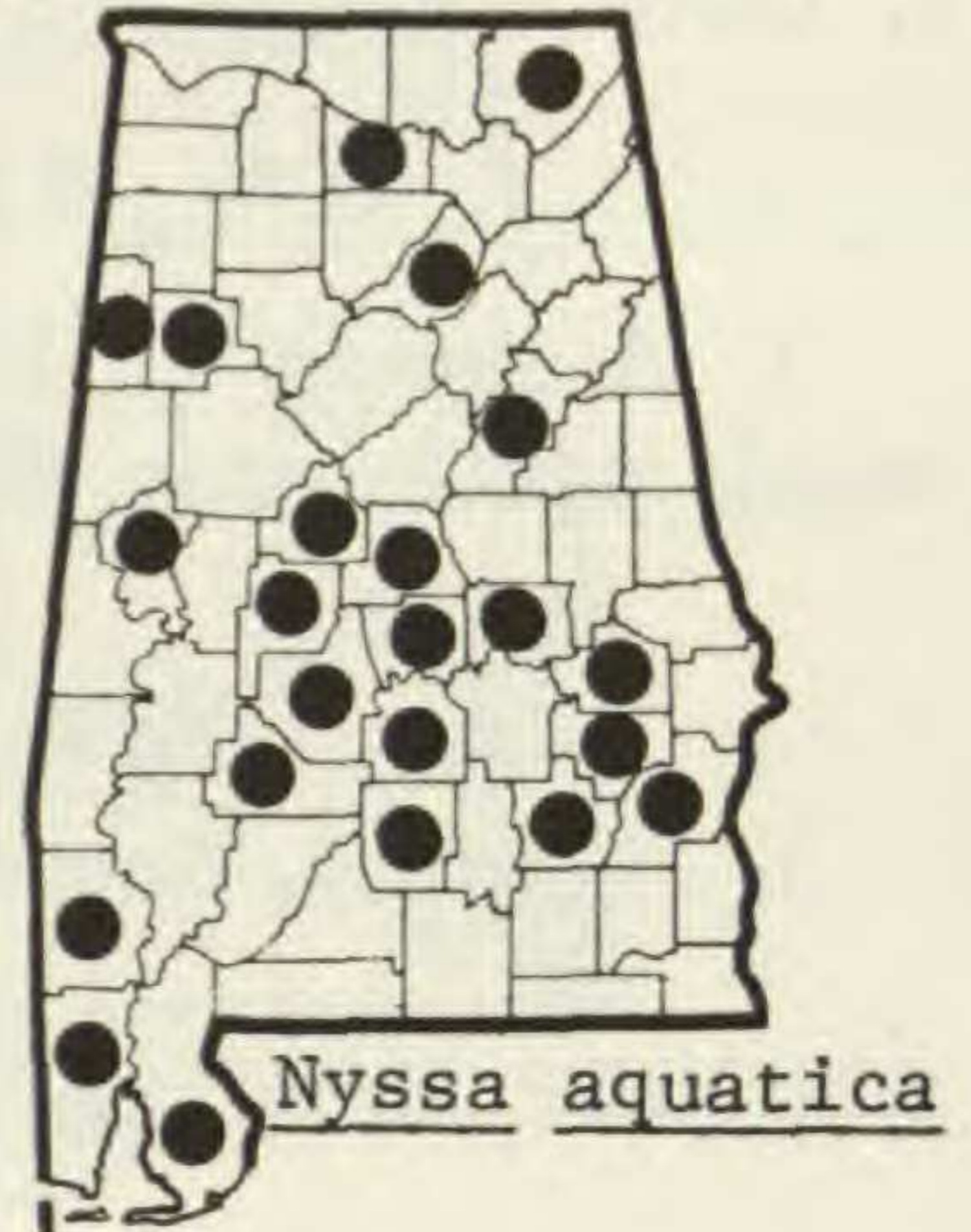
2. *C. amomum* Miller, RED-OSIER D. Spring; summer. Streambanks, low woods, marshes; throughout, but more infrequent southward. *Svida amomum* (Mill.) Sm.—S; *C. stricta* Lam.—H, in part.

3. *C. asperifolia* Michaux. Spring; summer-fall. Fencerows, thickets, and woods in circumneutral situations; principally Black Belt of CP. *Svida microcarpa* (Nash) Sm., *S. asperifolia* (Michx.) Sm.—S.—Western populations of simi-

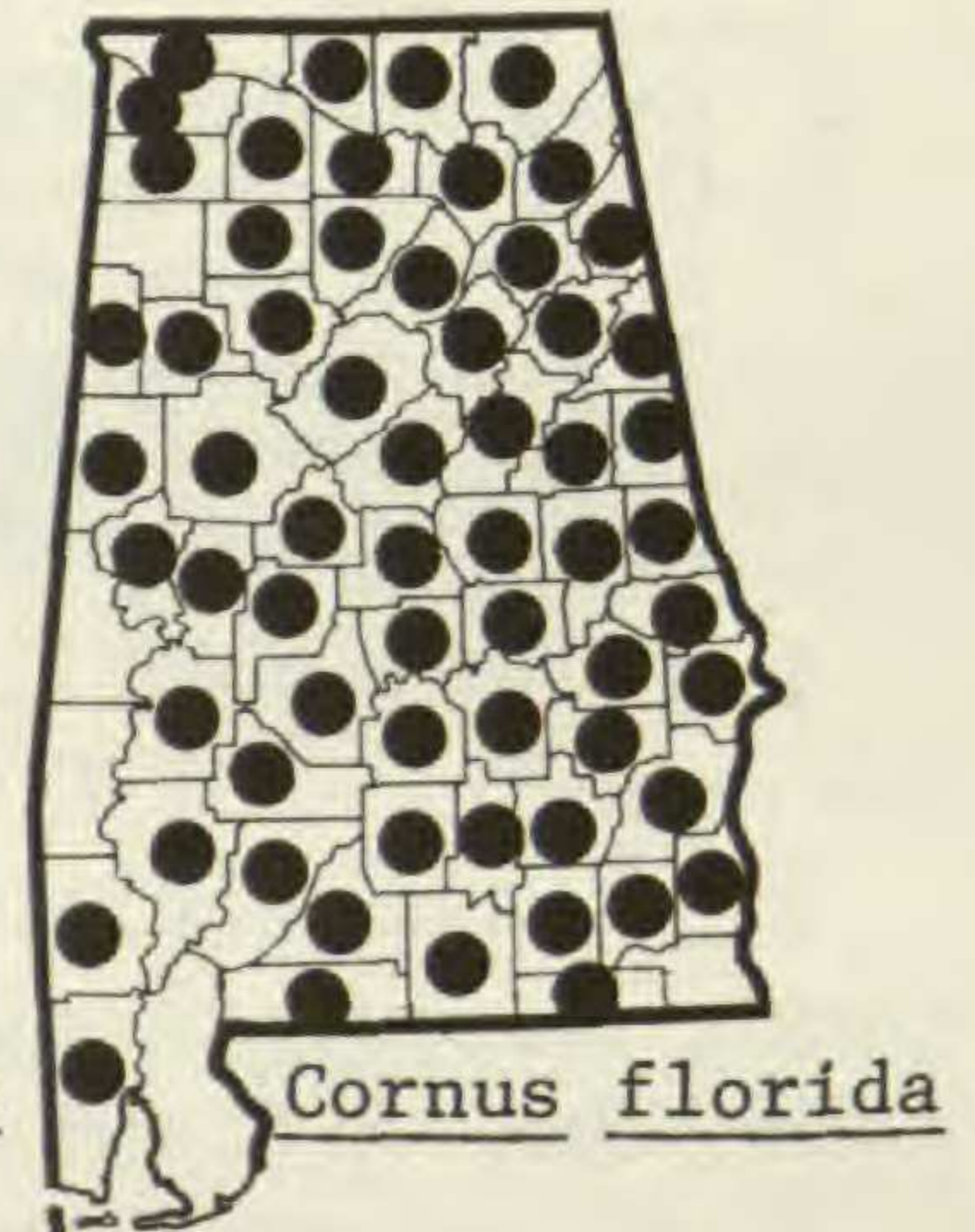
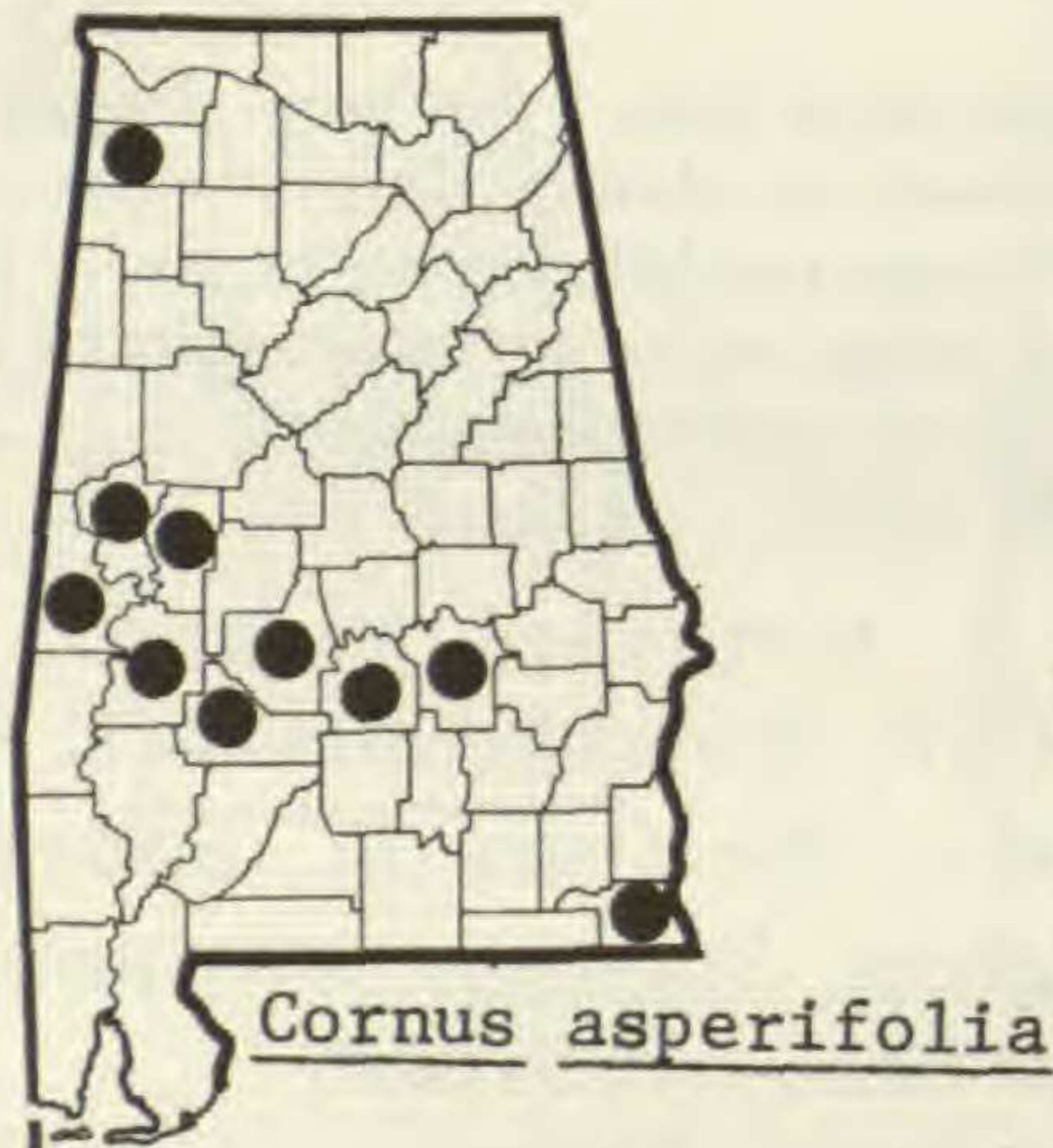
54. ARALIACEAE



55. NYSSACEAE



56. CORNACEAE



lar plants, which are generally referred to *C. drummondii* C. A. Meyer, appear little different from Alabama plants.

4. *C. florida* L., FLOWERING D. Spring; late summer-fall. Woods, throughout. *Cynoxylon floridum* (L.) Raf.—S.

5. *C. stricta* Lamarck. Spring; summer. Ditches, low woods and swamps; throughout, but most common in CP. *Svida stricta* (Lam.) Sm.—S.

*Cornus racemosa* Lamarck has been credited to Alabama (Dean, 1961), but no specimens have been seen by the writer. This report should be questioned.

#### 57. CLETHRACEAE

##### 1. *Clethra* L., WHITE ALDER, SWEET PEPPERBUSH

1. *C. alnifolia* L. Summer; late summer-fall.

- |  |   |
|--|---|
| 1. Leaves glabrous or glabrate beneath ..... | <i>C. alnifolia</i> var. <i>alnifolia</i> |
| 1. Leaves densely tomentose beneath .....    | <i>C. alnifolia</i> var. <i>tomentosa</i> |

*C. alnifolia* L. var. *alnifolia*. Low woods, rare; CP, CuP.

*C. alnifolia* L. var. *tomentosa* (Lamarck) Michaux. Swamp ecotones, bogs, seepages, low pinelands; principally southern CP. *C. tomentosa* Lam.—S.

#### 58. EMPETRACEAE

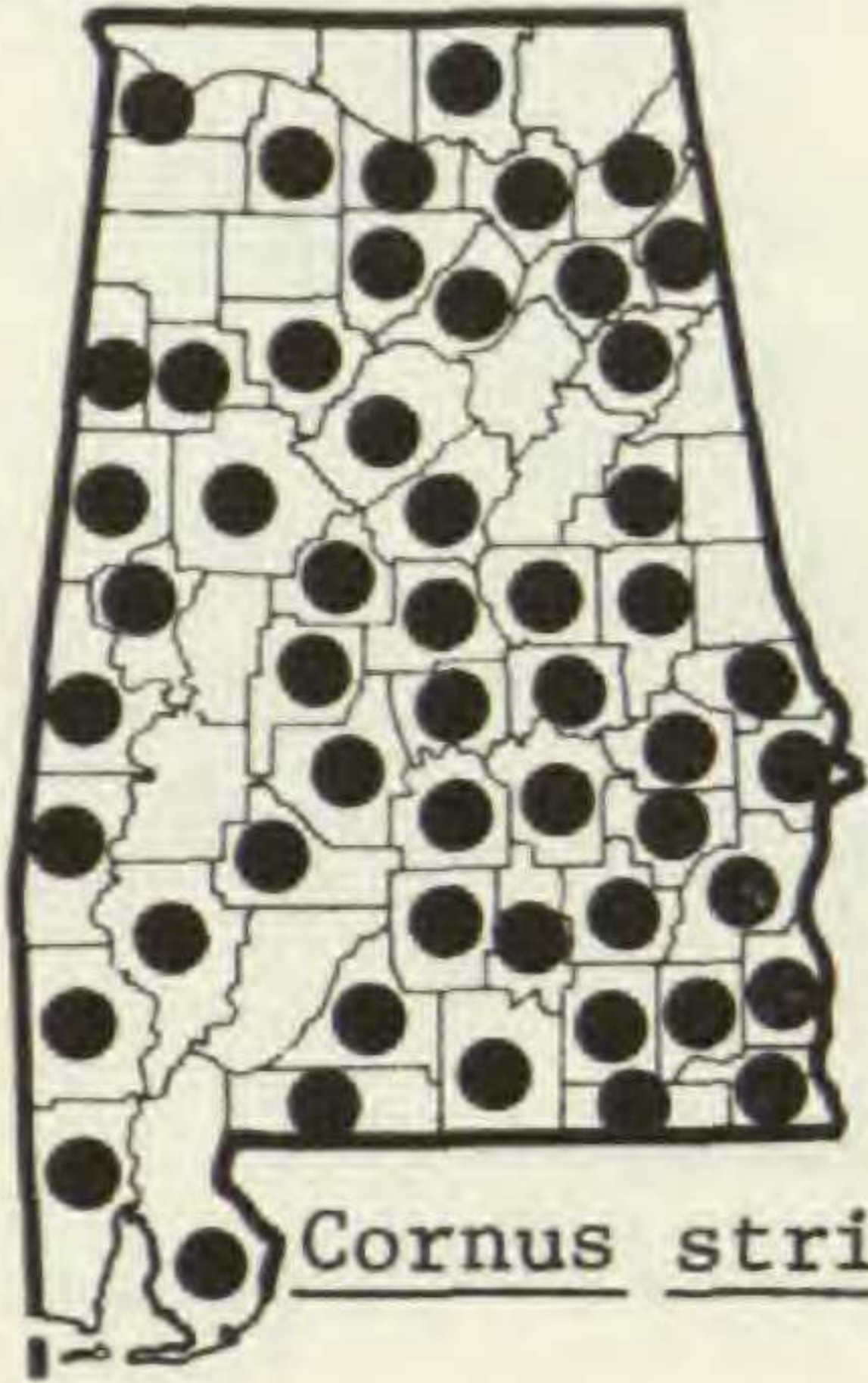
##### 1. *Ceratiola* Michaux, ROSEMARY

1. *C. ericoides* Michaux. Fall. Dunes, sandy woods, rare; OCP.

#### 59. ERICACEAE

- |   |                       |
|---|-----------------------|
| 1. Leaves variegated, evergreen .....   | 1. <i>Chimaphila</i>  |
| 1. Leaves green, not variegated; or leaves deciduous .....                            | 2                     |
| 2. Ovary inferior .....   | 3                     |
| 3. Anthers spurred; ovules and seeds many .....                                       | 10. <i>Vaccinium</i>  |
| 3. Anthers unappendaged; ovules and nutlets 10 .....                                  | 3. <i>Gaylussacia</i> |
| 2. Ovary superior .....   | 4                     |
| 4. Plant creeping .....   | 5                     |
| 5. Leaves distally toothed .....  | 8. <i>Pieris</i>      |
| 5. Leaves entire .....  | 2. <i>Epigaea</i>     |
| 4. Plant erect, ascending or arching .....  | 6                     |
| 6. Plant in flower .....  | 7                     |
| 7. Corolla urceolate or cylindrical .....   | 8                     |
| 8. Inflorescences axillary .....  | 9                     |
| 9. Leaves entire, often involute .....  | 6. <i>Lyonia</i>      |
| 9. Leaves serrate, at least distally .....  | 10                    |
| 10. Pedicels more than 3 mm long; corolla urceolate; leaves obtuse to acute .....     | 8. <i>Pieris</i>      |
| 10. Pedicels less than 2 mm long; corolla cylindrical; leaves usually acuminate ..... | 5. <i>Leucothoe</i>   |
| 8. Inflorescences terminal on branches or main stems .....                            | 11                    |
| 11. Ovary pubescent .....   | 12                    |
| 12. Corolla pubescent exteriorly, more than 5 mm long .....                           | 7. <i>Oxydendrum</i>  |
| 12. Corolla glabrous exteriorly, less than 5 mm long .....                            | 6. <i>Lyonia</i>      |
| 11. Ovary glabrous .....  | 13                    |
| 13. Leaves evergreen .....  | 8. <i>Pieris</i>      |
| 13. Leaves deciduous .....  | 5. <i>Leucothoe</i>   |

57. CLETHRACEAE



Cornus stricta



Clethra alnifolia  
var. alnifolia



Clethra alnifolia  
var. tomentosa

58. EMPETRACEAE



Ceratiola ericoides

59. ERICACEAE



Chimaphila  
maculata



Epigaea repens



Gaylussacia  
baccata



Gaylussacia dumosa



Gaylussacia  
frondosa var.  
frondosa

- 7. Corolla campanulate, funnelform or tubular, the lobes often widely spreading distally ..... 14
  - 14. Corolla campanulate; anthers in corolla pouches ..... 4. *Kalmia*
  - 14. Corolla funnelform or tubular proximally, its lobes widely spreading distally, corolla lacking anther pouches ..... 9. *Rhododendron*
- 6. Plant in fruit ..... 15
  - 15. Leaves entire ..... 16
    - 16. Capsule cylindrical, longer than broad, more than 8 mm long ..... 9. *Rhododendron*
    - 16. Capsule subglobose, broader than long, less than 6 mm long ..... 17
      - 17. Capsule glabrous, with longitudinal light-colored stripes along the suture lines ..... 6. *Lyonia*
      - 17. Capsule pubescent or stipitate-glandular, not longitudinally striped ..... 4. *Kalmia*
  - 15. Leaves serrate, at least distally ..... 18
    - 18. Capsule pubescent ..... 19
      - 19. Capsule subcylindric, about 2 times longer than broad, not longitudinally striped ..... 7. *Oxydendrum*
      - 19. Capsule subglobose, broader than long, with longitudinal light-colored stripes along the suture lines ..... 6. *Lyonia*
    - 18. Capsule glabrous ..... 20
      - 20. Inflorescences terminal on branches; leaves deciduous ..... 5. *Leucothoe*
      - 20. Inflorescences axillary; leaves evergreen ..... 20
        - 21. Leaves obtuse to acute ..... 8. *Pieris*
        - 21. Leaves, at least most, acuminate ..... 5. *Leucothoe*

1. *Chimaphila* Pursh, PIPSISSEWA

1. *C. maculata* (L.) Pursh, SPOTTED WINTERGREEN. Spring; summer-fall. Rich and upland woods; CuP, VR.

2. *Epigaea* L., TRAILING ARBUTUS

1. *E. repens* L. Spring. Open, rocky woods, infrequent to rare; AM, CuP, VR.

3. *Gaylussacia* HBK, HUCKLEBERRY

- 1. Bracts of raceme longer than pedicels, persisting until fruits mature ..... 2. *G. dumosa*
- 1. Bracts of raceme shorter than pedicels, soon deciduous ..... 2
- 2. Leaves glandular on both surfaces ..... 3
  - 3. Branchlets, inflorescences and fruits stipitate-glandular ..... 4. *G. mosieri*
  - 3. Branchlets, inflorescences and fruits not stipitate-glandular ..... 1. *G. baccata*
- 2. Leaves glandular only beneath ..... 3. *G. frondosa*

1. *G. baccata* (Wang.) K. Koch. Credited to Alabama by Ahles in RAB; no specimens seen by the writer. *Decachaena baccata* (Wang.) Sm.—S.

2. *G. dumosa* (Andrz.) Torrey & Gray, GOPHER-BERRY. Spring; summer-fall. Sandy woods or open ground, infrequent; OCP, CP, VR. *Lasiococcus dumosus* (Andr.) Sm.—S.

3. *G. frondosa* (L.) Torrey & Gray. Spring; summer.

- 1. Corolla about 4 mm long; sepals  $\frac{1}{3}$  or less as long as corolla tube ..... 2
  - 2. Leaves glabrate to puberulent beneath ..... *G. frondosa* var. *frondosa*
  - 2. Leaves densely pubescent beneath ..... *G. frondosa* var. *tomentosa*
- 1. Corolla about 3 mm long; sepals more than  $\frac{1}{3}$  the length of corolla tube ..... *G. frondosa* var. *nana*

*G. frondosa* (L.) Torrey & Gray var. *frondosa*. Low, open woods, rare; OCP, P. *Decachaena frondosa* (L.) T & G.—S.



Gaylussacia frondosa var. nana



Gaylussacia frondosa var. tomentosa



Gaylussacia mosieri



Kalmia hirsuta



Kalmia latifolia



Leucothoe axillaris var. axillaris



Leucothoe axillaris var. editorum



Leucothoe racemosa



Lyonia ligustrina



*G. frondosa* (L.) Torrey & Gray var. *nana* Gray. Sandy ground; OCP. *Decachaena nana* (Gray) Sm.—S.

*G. frondosa* (L.) Torrey & Gray var. *tomentosa* Gray. Reported by Ahles in RAB; no specimens seen by the writer. *Decachaena tomentosa* (Pursh) Sm.—S.

4. *G. mosieri* Small. Spring; summer. Creek swamps, rare; OCP. *Lasiococcus mosieri* Sm.—S.

#### 4. *Kalmia* L.

1. Twigs hirsute ..... 1. *K. hirsuta*  
1. Twigs glabrous ..... 2. *K. latifolia*

1. *K. hirsuta* Walter, WICKY. Late spring—early summer; late summer—fall. Low pinelands, rare, OCP. *Kalmiella hirsuta* (Walt.) Sm.—S.

2. *K. latifolia* L., MOUNTAIN LAUREL. Spring; summer—fall. Rocky or rich woods; throughout, but more common northward.

#### 5. *Leucothoe* D. Don

1. Leaves evergreen; inflorescences axillary ..... 1. *L. axillaris*  
1. Leaves deciduous; inflorescences terminal ..... 2. *L. racemosa*

1. *L. axillaris* (Lamarck) D. Don. Spring; late summer—fall.

1. Petioles 8 mm or less long; leaves acute to abruptly acuminate ..... *L. axillaris* var. *axillaris*

1. Petioles 8 mm long or longer; leaves acuminate ..... *L. axillaris* var. *editorum*

*L. axillaris* (Lam.) D. Don var. *axillaris*. Swamp forests, seepages, rare; CP. *L. catesbaei* (Walt.) Gray—S.

*L. axillaris* (Lam.) D. Don var. *editorum* (Fernald & Schubert) Ahles. Mesic woods, rare; AM.

2. *L. racemosa* (L.) Gray. Spring; late summer—fall. Bogs, seepages, ditches, pond margins; CP, CuP. *Eubotrys racemosa* (L.) Nutt.—S.

#### 6. *Lyonia* Nuttall

1. Leaves deciduous; corolla globose; capsule 4.5 mm or less long ..... 1. *L. ligustrina*  
1. Leaves evergreen; corolla subcylindrical; capsule more than 4.5 mm long ..... 2. *L. lucida*

1. *L. ligustrina* (L.) DC. Spring; late summer—fall. Bogs, seepages, pond margins, infrequent; CP, P, AM, VR, CuP. *Xolisma ligustrina* (L.) Britt., *X. ligustrina foliosiflora* (Michx.) Mohr—M; *Cholisma ligustrina* (L.) Britt.—H; *Arsenococcus ligustrinus* (L.) Sm.—S.

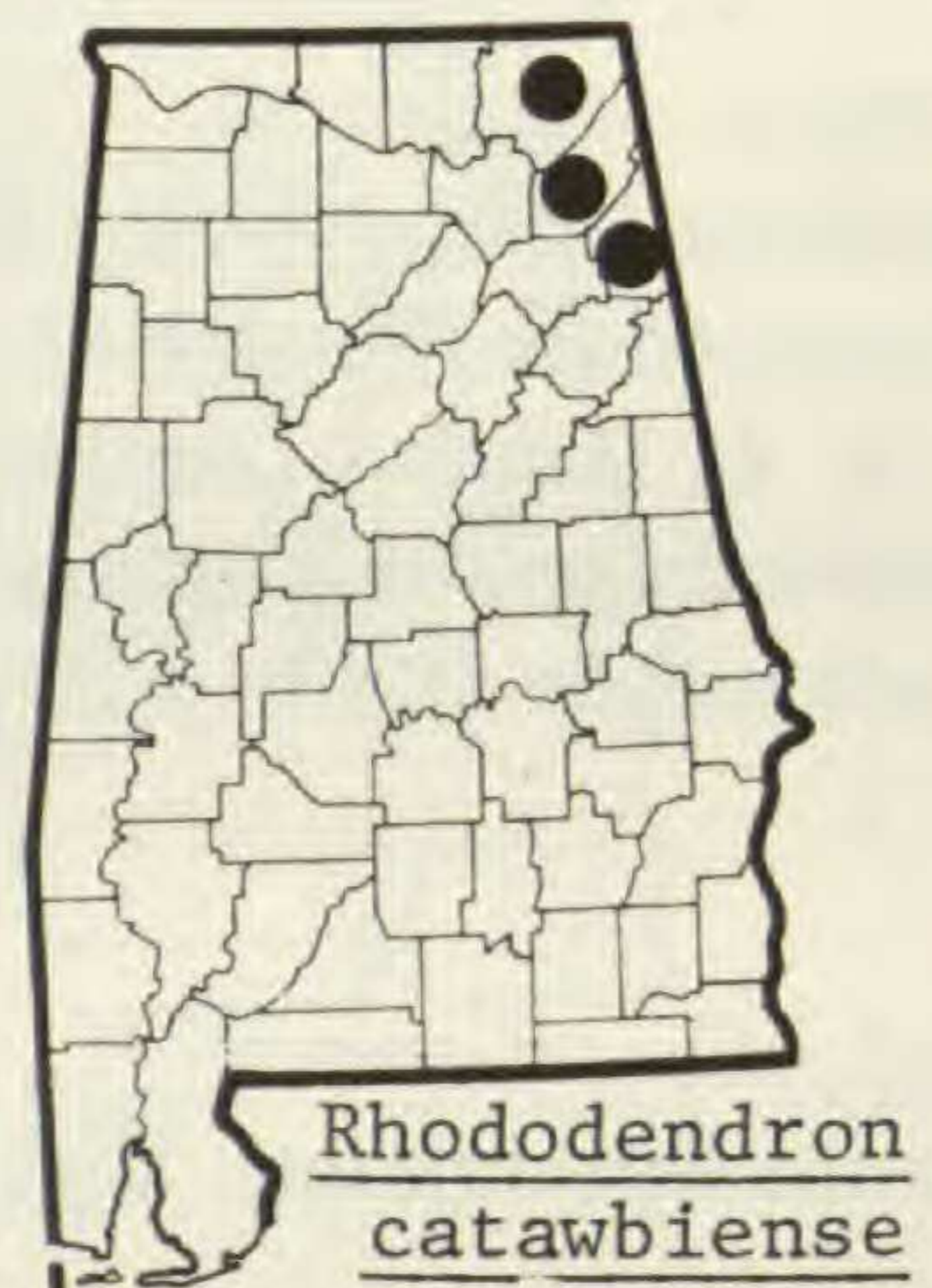
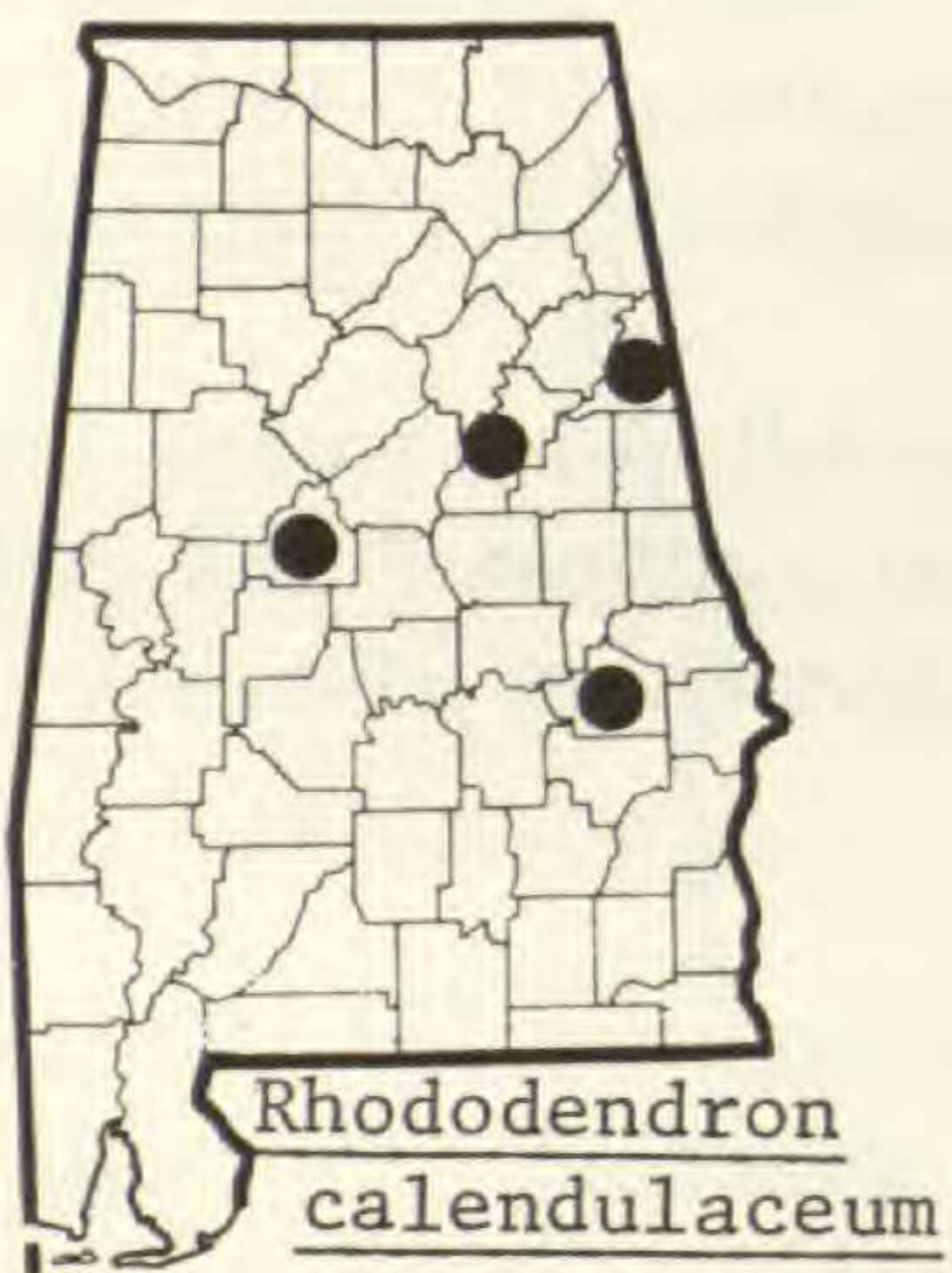
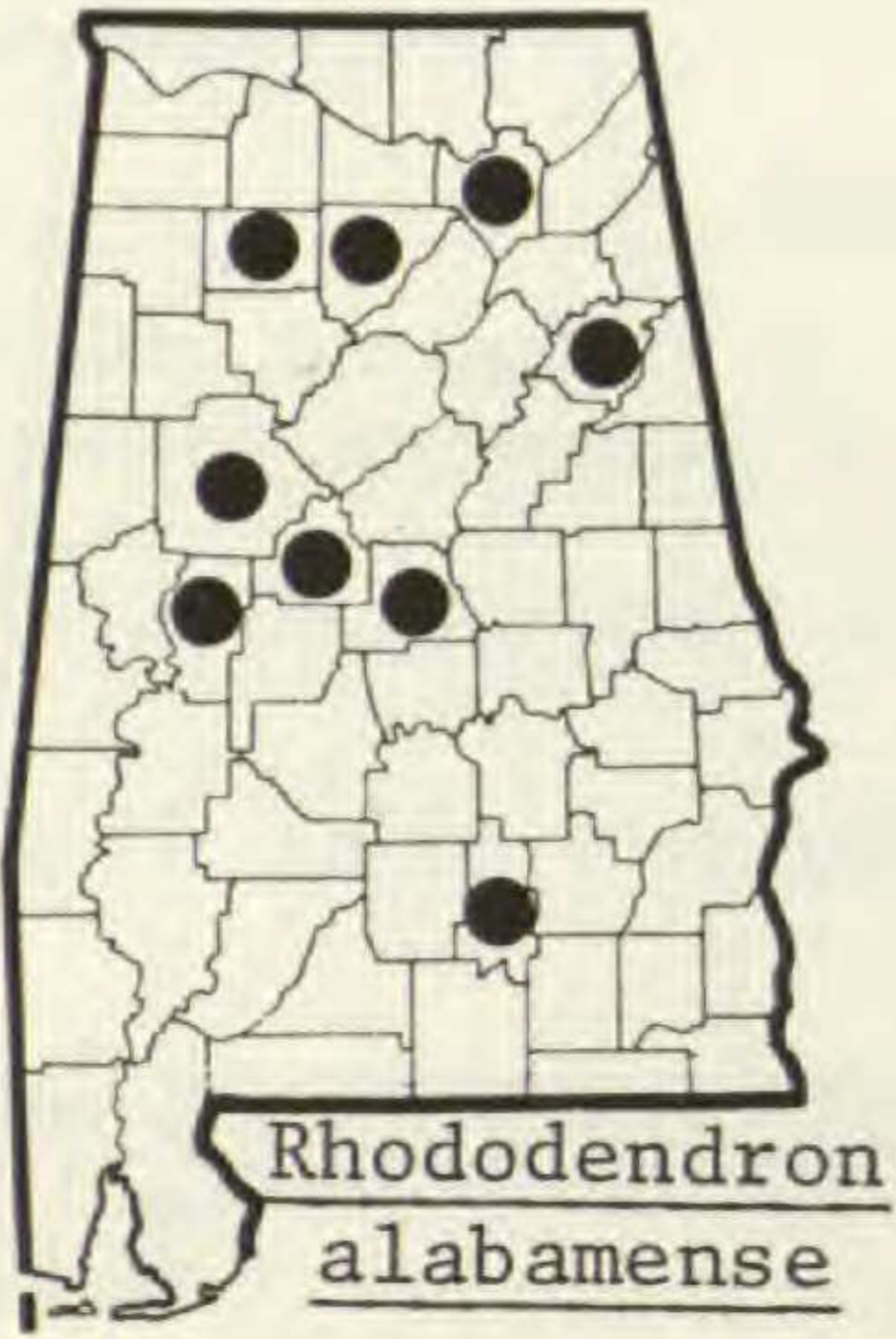
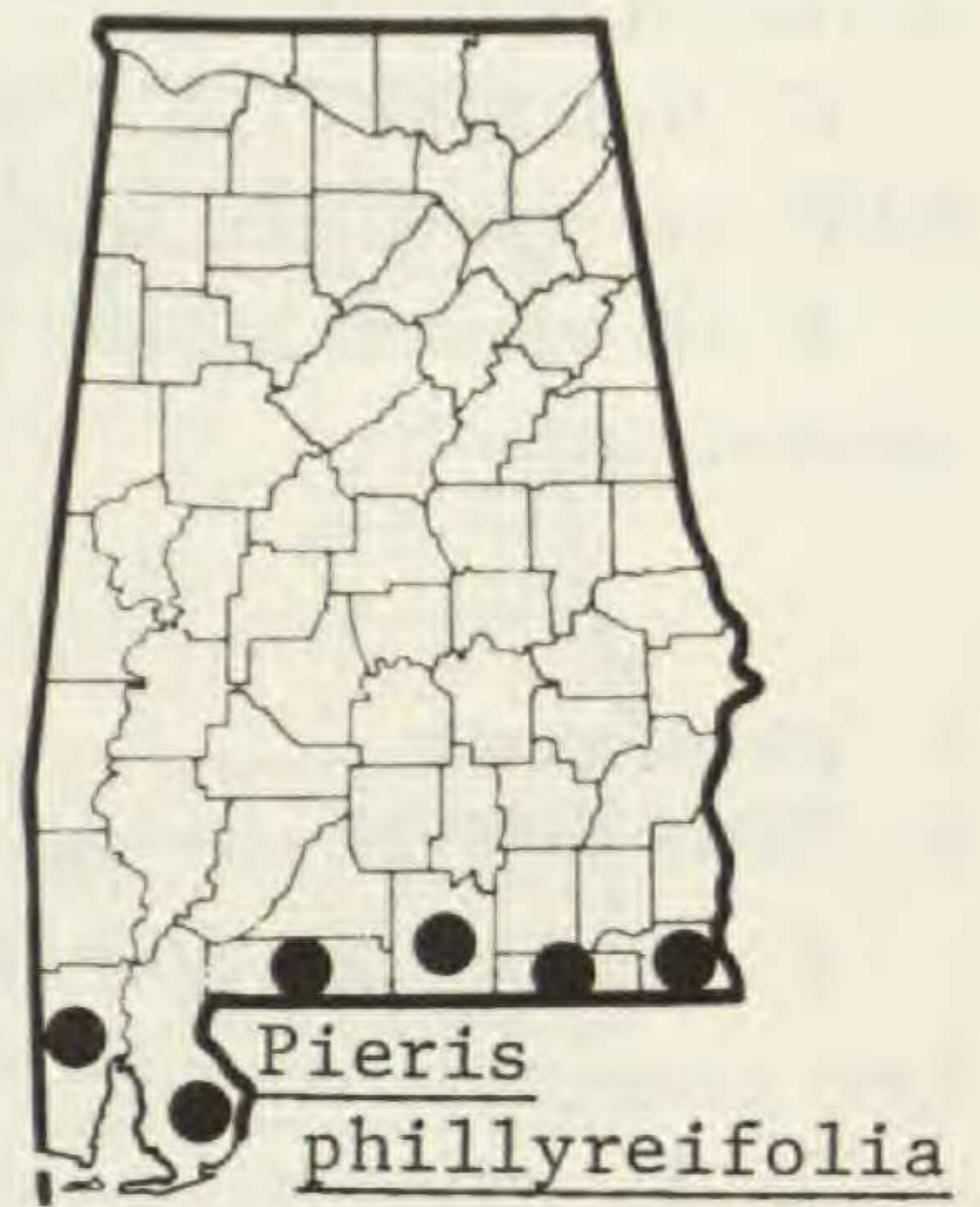
2. *L. lucida* (Lamarck) K. Koch. Spring; late summer—fall. Low woods, low pinelands, creek swamps; chiefly southern CP, but rare in southern P and AM. *Pieris nitida* (Bartr.) B. & H.—M, H; *Desmothamnus lucidus* (Lam.) Sm.—S.

#### 7. *Oxydendrum* DC., SOURWOOD

1. *O. arboreum* (L.) DC. Late spring—summer; late summer—fall. Upland woods; throughout.

#### 8. *Pieris* D. Don

1. *P. phillyreifolia* (Hooker) DC. Late winter—spring; summer—fall. Ponds, swamp margins, infrequent; OCP.



9. *Rhododendron* L.

- |  |                              |
|--|------------------------------|
| 1. Leaves evergreen, entire; stamens 10 .....  | 2                            |
| 2. Leaves punctate beneath .....   | 8. <i>R. minus</i>           |
| 2. Leaves not punctate beneath .....   | 6. <i>R. catawbiense</i>     |
| 1. Leaves deciduous, serrulate or ciliate; stamens 5-7 .....                             | 3                            |
| 3. Twigs glandular or glabrous .....   | 4                            |
| 4. Twigs glandular .....   | 5                            |
| 5. Mature bud scales pubescent abaxially .....   | 3. <i>R. austrinum</i>       |
| 5. Mature bud scales glabrous abaxially .....  | 11. <i>R. viscosum</i>       |
| 4. Twigs glabrous .....  | 2. <i>R. arborescens</i>     |
| 3. Twigs eglandular, pubescent .....   | 6                            |
| 6. Corolla tube eglandular, capsule not canescent .....                                  | 7                            |
| 7. Leaves canescent above, at least along the midvein .....                              | 7. <i>R. flammeum</i>        |
| 7. Leaves not canescent above .....  | 10. <i>R. prunifolium</i>    |
| 6. Corolla tube glandular; capsule canescent, at least basally .....                     | 8                            |
| 8. Leaves not pubescent beneath .....  | 9                            |
| 9. Pedicels and calyces eglandular .....   | 9. <i>R. periclymenoides</i> |
| 9. Pedicels and calyces glandular .....  | 11. <i>R. viscosum</i>       |
| 8. Leaves pubescent beneath .....  | 10                           |
| 10. Pedicels and calyces eglandular .....  | 11                           |
| 11. Corollas red, orange, or yellow .....  | 7. <i>R. flammeum</i>        |
| 11. Corollas pink or white .....   | 12                           |
| 12. Leaves strigose or hirsute beneath, at least along the midveins .....                | 9. <i>R. periclymenoides</i> |
| 12. Leaves canescent beneath, midveins not strigose or hirsute .....                     | 5. <i>R. canescens</i>       |
| 10. Pedicels or calyces glandular .....  | 13                           |
| 13. Mature bud scales pubescent abaxially .....  | 14                           |
| 14. Corollas orange, red or yellow; pedicels and capsules not hoary .....                | 15                           |
| 15. Canescence on upper sides of leaves confined to midveins .....                       | 4. <i>R. calendulaceum</i>   |
| 15. Canescence on upper sides of leaves distributed over the surfaces and veins .....    | 1. <i>R. alabamense</i>      |
| 14. Corollas pink or white; pedicels and capsules hoary .....                            | 5. <i>R. canescens</i>       |
| 13. Mature bud scales not pubescent abaxially .....                                      | 16                           |
| 16. Leaves canescent above, at least along the midvein .....                             | 17                           |
| 17. Canescence on upper surfaces of leaves confined to midveins .....                    | 4. <i>R. calendulaceum</i>   |
| 17. Canescence on upper sides of leaves distributed over the surfaces and midveins ..... | 1. <i>R. alabamense</i>      |
| 16. Leaves glabrous above, even along the midveins .....                                 | 11. <i>R. viscosum</i>       |

1. *R. alabamense* Rehder, AZALEA. Spring; summer-fall. Upland woods; rare; CP, CuP, VR. *Azalea alabamensis* (Rehd.) Sm.—S.

2. *R. arborescens* (Pursh) Torrey, AZALEA. Spring-early summer; summer-fall. Streambanks, seepages; P, CuP. *Azalea arborescens* Pursh—M, H, S.

3. *R. austrinum* Rehder, AZALEA. Summer; fall. Rich woods, infrequent; CP, AM. *Azalea austrina* Sm.—S.—Very showy.

4. *R. calendulaceum* (Michaux) Torrey, FLAME AZALEA. Spring; summer. Rocky woods, rare; P, AM. *Azalea calendulacea* Michx.—S.

5. *R. canescens* (Michx) Sweet, AZALEA. Spring; summer. Moist woods, infrequent; CP, CuP. *Azalea canescens* Michx.—S.

6. *R. catawbiense* Michaux, PINK RHODODENDRON, ROSEBAY. Spring; summer-fall. Rocky woods; CuP.

7. *R. flammeum* (Michaux) Sargent, FLAME AZALEA. Spring; summer-fall. Rocky woods, local; AM. *Azalea speciosa* Willd.—S.—Very showy.

8. *R. minus* Michaux. Spring; summer-fall. Mesic, rocky woods, infrequent; AM, CP. *R. punctatum* Andr.—H; *R. carolinianum* Rehd.—S.

9. *R. periclymenoides* (Michaux) Shinnars, AZALEA. Spring; summer-fall. Upland woods and seepages; throughout. *Azalea nudiflora* L.—M, H, S; *A. lutea* L.—H; *R. nudiflorum* (L.) Torr.—RAB.

10. *R. prunifolium* Millais, AZALEA. Spring. Reported from rich woods of southeastern CP. *Azalea prunifolia* Sm.—H, S.

11. *R. viscosum* (L.) Torrey var. *serrulatum* (Small) Ahles, AZALEA. Summer; summer-fall. Low ground, rare; CP. *Azalea viscosa* L.—M, H, S; *A. viscosa glauca* (Lam.) Michx.—M.

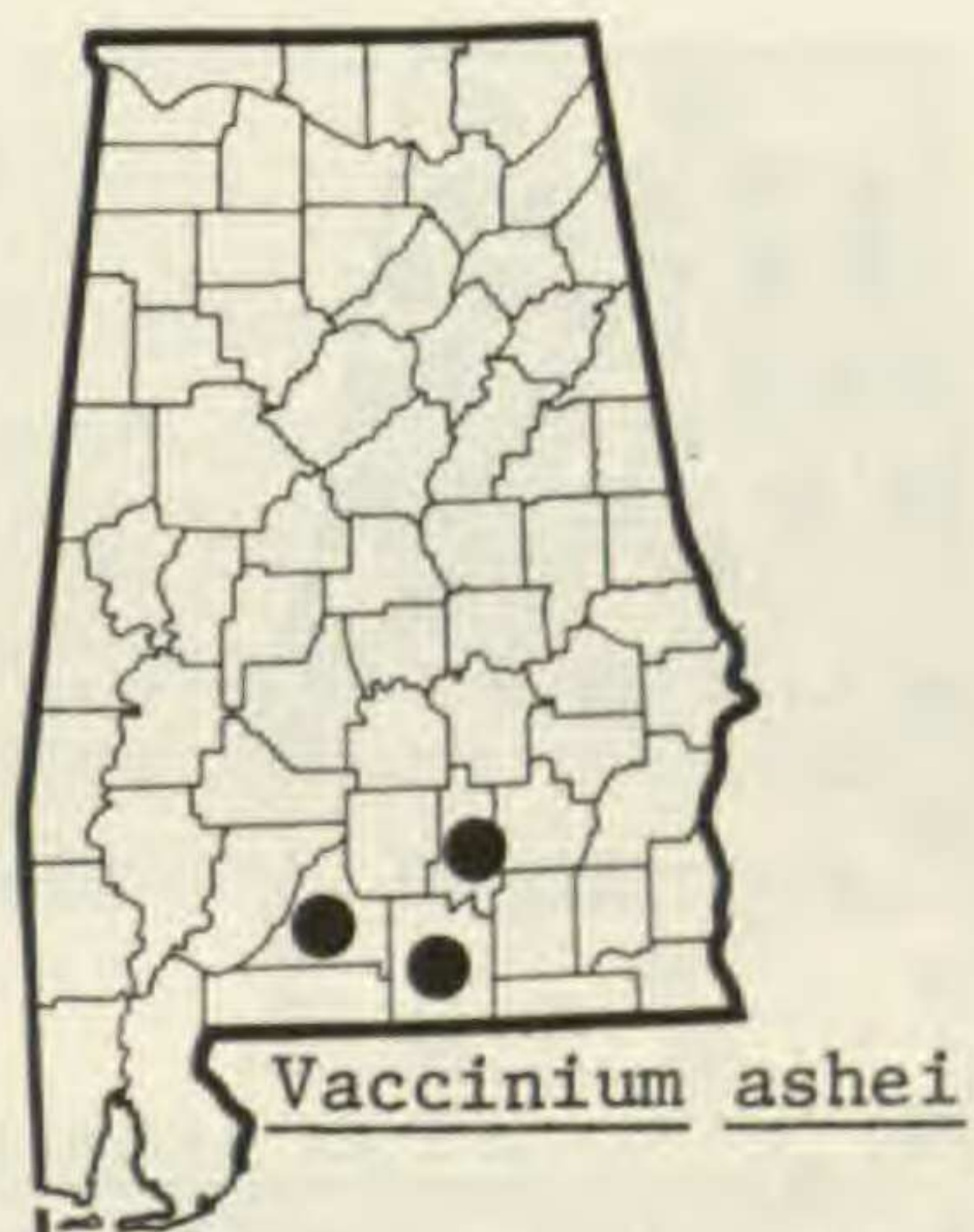
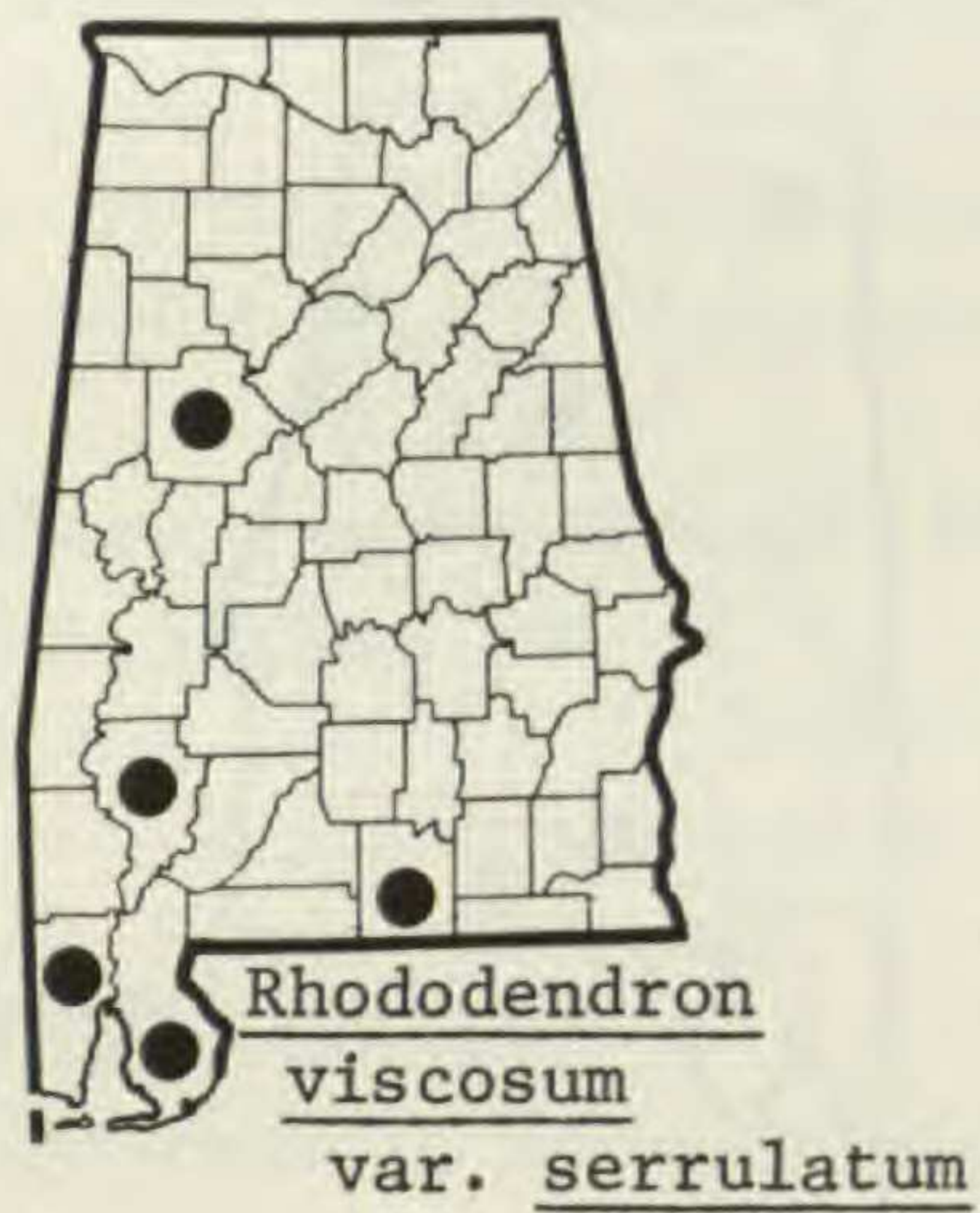
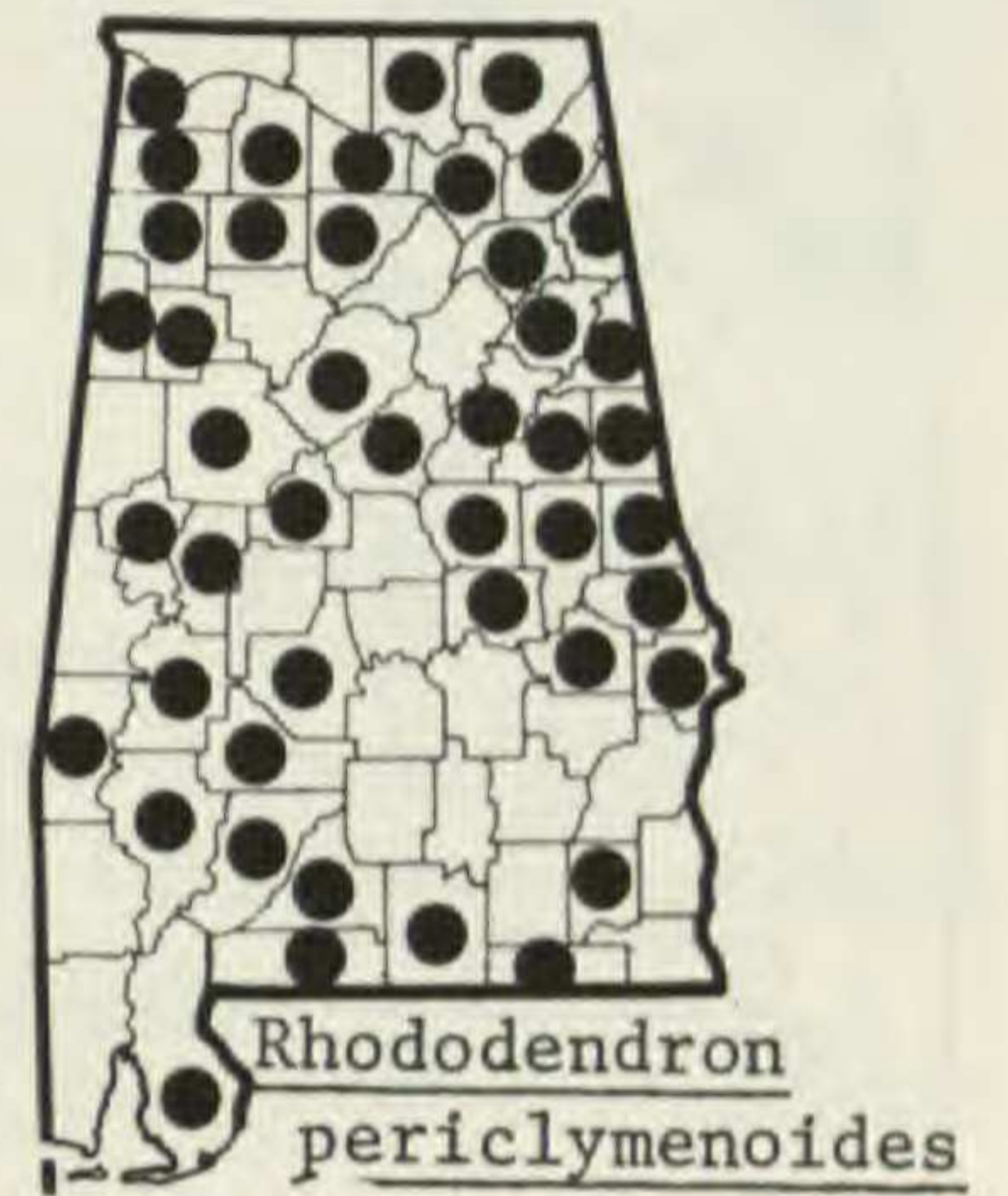
### 10. *Vaccinium* L., BLUEBERRY

- |  |                            |
|--|----------------------------|
| 1. Plant in flower   | 2                          |
| 2. Stamens exerted beyond the corolla  | 3                          |
| 3. Corolla lobes 4   | 8. <i>V. erythrocarpum</i> |
| 3. Corolla lobes 5   | 12. <i>V. stamineum</i>    |
| 2. Stamens included within the corolla   | 4                          |
| 4. Corolla campanulate   | 2. <i>V. arboreum</i>      |
| 4. Corolla urceolate   | KEY 1                      |
| 1. Plant in fruit  | 5                          |
| 5. Bracts leaf-like  | 6                          |
| 6. Leaf margins regularly serrulate  | 8. <i>V. erythrocarpum</i> |
| 6. Leaf margins not serrulate, sometimes remotely glandular                              | 7                          |
| 7. Pedicels glabrous   | 2. <i>V. arboreum</i>      |
| 7. Pedicels pubescent  | 8                          |
| 8. Distal half of pedicel woolly-pubescent; fruit green to purplish, sometimes pubescent | 12. <i>V. stamineum</i>    |
| 8. Distal half of pedicel glabrate, remotely pubescent; fruit black, glabrous            | 2. <i>V. arboreum</i>      |
| 5. Bracts scale-like   | KEY 1                      |

#### KEY 1

(Adapted from Camp, 1942)

- |  |                          |
|--|--------------------------|
| 1. Leaves evergreen  | 2                        |
| 2. Plant 1 m or less tall  | 3                        |
| 3. Leaves glandular  | 10. <i>V. myrsinites</i> |
| 3. Leaves eglandular   | 6. <i>V. darrowii</i>    |
| 2. Plant 1.5 m tall or taller  | 4                        |
| 4. Leaves glandular  | 3. <i>V. ashei</i>       |
| 4. Leaves eglandular   | 9. <i>V. fuscatum</i>    |
| 1. Leaves deciduous  | 5                        |
| 5. Leaves minutely stipitate-glandular beneath                           | 6                        |
| 6. Glands abundant and conspicuous; leaves spatulate to oblanceolate     | 1. <i>V. amoenum</i>     |
| 6. Glands sparse, inconspicuous; leaves broadly oblanceolate to elliptic | 3. <i>V. ashei</i>       |
| 5. Leaves eglandular beneath   | 7                        |
| 7. Leaves serrate  | 8                        |
| 8. Leaves averaging 3 cm or less long                                    | 7. <i>V. elliottii</i>   |
| 8. Leaves averaging more than 3 cm long                                  | 9                        |
| 9. Plant 1 m or less tall  | 11. <i>V. pallidum</i>   |
| 9. Plant 1.5 m tall or taller  | 10                       |
| 10. Twigs glabrous   | 5. <i>V. corymbosum</i>  |
| 10. Twigs pubescent  | 4. <i>V. atrococcum</i>  |
| 7. Leaves entire   | 11                       |





Vaccinium corymbosum



Vaccinium darrowii



Vaccinium elliotii



Vaccinium erythrocarpum



Vaccinium fuscatum



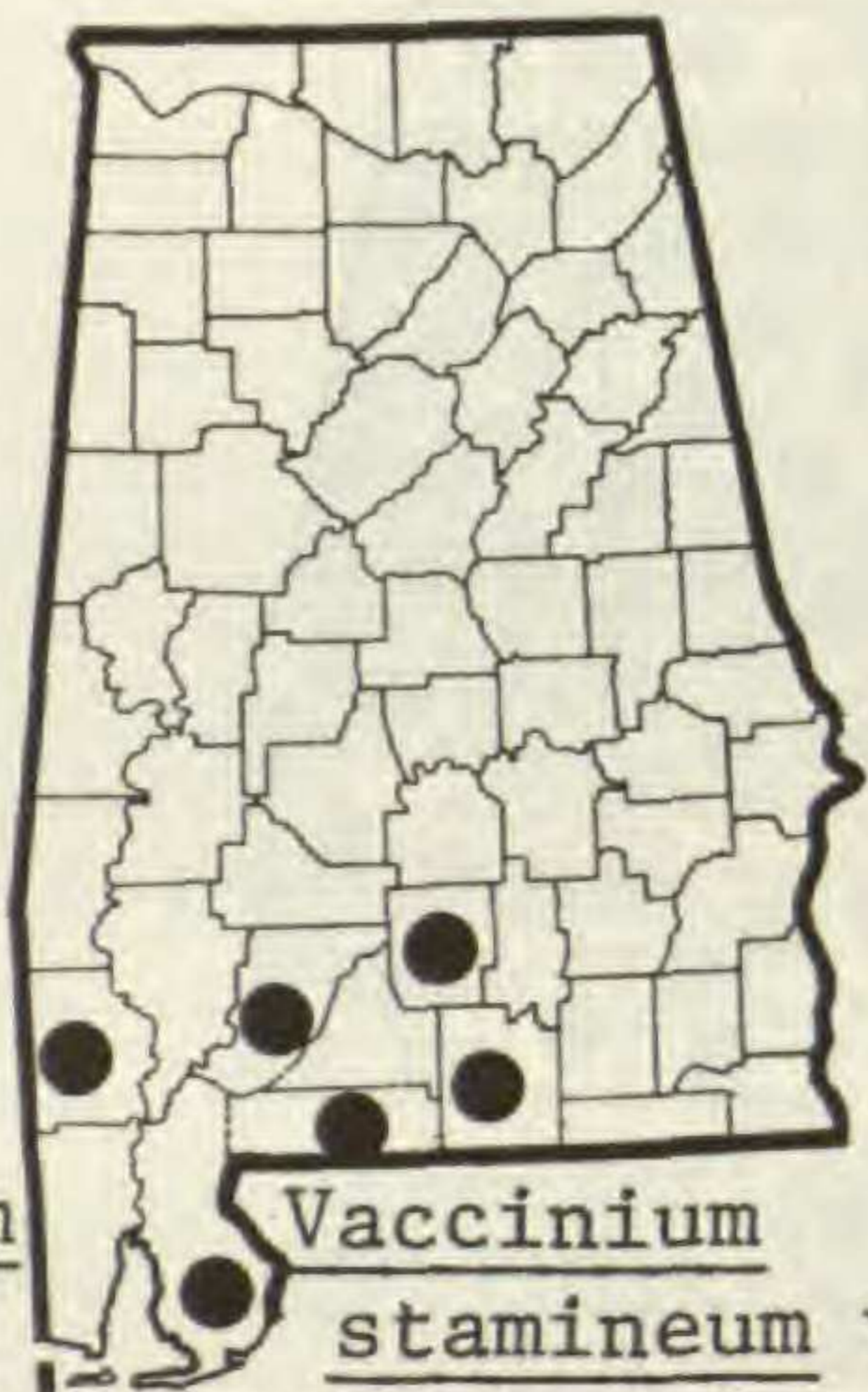
Vaccinium myrsinites



Vaccinium pallidum



Vaccinium stamineum  
var. stamineum



Vaccinium stamineum var.  
melanocarpum

- |                                      |                         |
|--------------------------------------|-------------------------|
| 11. Plant 1 m or less tall .....     | 11. <i>V. pallidum</i>  |
| 11. Plant 1.5 m tall or taller ..... | 12                      |
| 12. Twigs glabrous .....             | 5. <i>V. corymbosum</i> |
| 12. Twigs pubescent .....            | 4. <i>V. atrococcum</i> |

Most of the taxa listed here are in great need of biosystematic study and reassessment.

1. *V. amoenum* Aiton. Spring; summer. Sandy ground; CP. *V. virgatum* Ait., *V. corymbosum amoenum* (Ait.) Gray—M; *Cyanococcus amoenus* (Ait.) Sm., *C. virgatus* (Ait.) Sm., *C. tenellus* (Ait.) Sm.—S; *V. tenellum* Ait.—M, RAB.

2. *V. arboreum* Marshall, SPARKLEBERRY. Spring; fall. Upland woods, thickets, open areas; throughout. *Batodendron arboreum* (Marsh.) Nutt.—H, S.

3. *V. ashei* Reade. Spring; summer. Upland woods, rare, south-central OCP. Probably a segregate of species 5.

4. *V. atrococcum* (Gray) Porter. Late winter—spring. Deciduous woods, P, CuP, HR. *Cyanococcus atrococcus* (Gray) Sm., *C. margarettae* (Ashe) Sm.—S.

5. *V. corymbosum* L., Highbush B. Late winter—spring; summer. Mesic upland slopes or seepages, infrequent; throughout. *Cyanococcus simulatus* Sm.—S.

6. *V. darrowii* Camp. Spring; summer. Sandy woods; southern CP.

7. *V. elliotii* Chapman. Spring; late spring—early summer. Moist or sandy woods, streambanks; CP, P, AM, CuP, VR. *Cyanococcus elliotii* (Chapm.) Sm.—S.

8. *V. erythrocarpum* Michaux. Spring; summer. Reported from CuP by Dean (1961). *Hugeria erythrocarpa* (Michx.) Sm.—S.

9. *V. fuscatum* Aiton. Spring; summer. Upland woods; CP, AM, VR. *Cyanococcus fuscatus* (Ait.) Sm.—S.—Probably a segregate of species 5.

10. *V. myrsinites* Lamarck. Sandy woods, CP. *V. myrsinites glaucum* Gray—M; *Cyanococcus myrsinites* (Lam.) Sm.—S.

11. *V. pallidum* Aiton, Low-Bush B. Spring; summer. Upland woods; P, AM, VR, CuP. *V. vacillans* Torr.—RAB; *Cyanococcus pallidus* (Ait.) Sm., *C. vacillans* (Kalm) Rydb., *C. tallapusae* Cov.—S.

12. *V. stamineum* L. Spring; summer—fall.

- |  |  |
|--|--|
| 1. Branches and fruit glabrous or glabrate ..... | <i>V. stamineum</i> var. <i>stamineum</i>    |
| 1. Branches and fruit pubescent .....            | <i>V. stamineum</i> var. <i>melanocarpum</i> |

*V. stamineum* L. var. *stamineum*. Upland woods; throughout. *V. melanocarpum* Mohr, *V. melanocarpum candicans* Mohr—M; *Polycodium melanocarpum* (Mohr) Sm., *P. stamineum* (L.) Greene—H, S; *P. neglectum* Sm., *P. candicans* Sm., *P. melanocarpum* (Mohr) Sm.—S.

*V. stamineum* L. var. *melanocarpum* Mohr. Xeric woods; principally CP. *V. melanocarpum sericeum* Mohr—M; *Polycodium macilentum* Sm., *P. depressum* Sm.—S.

## 60. SAPOTACEAE

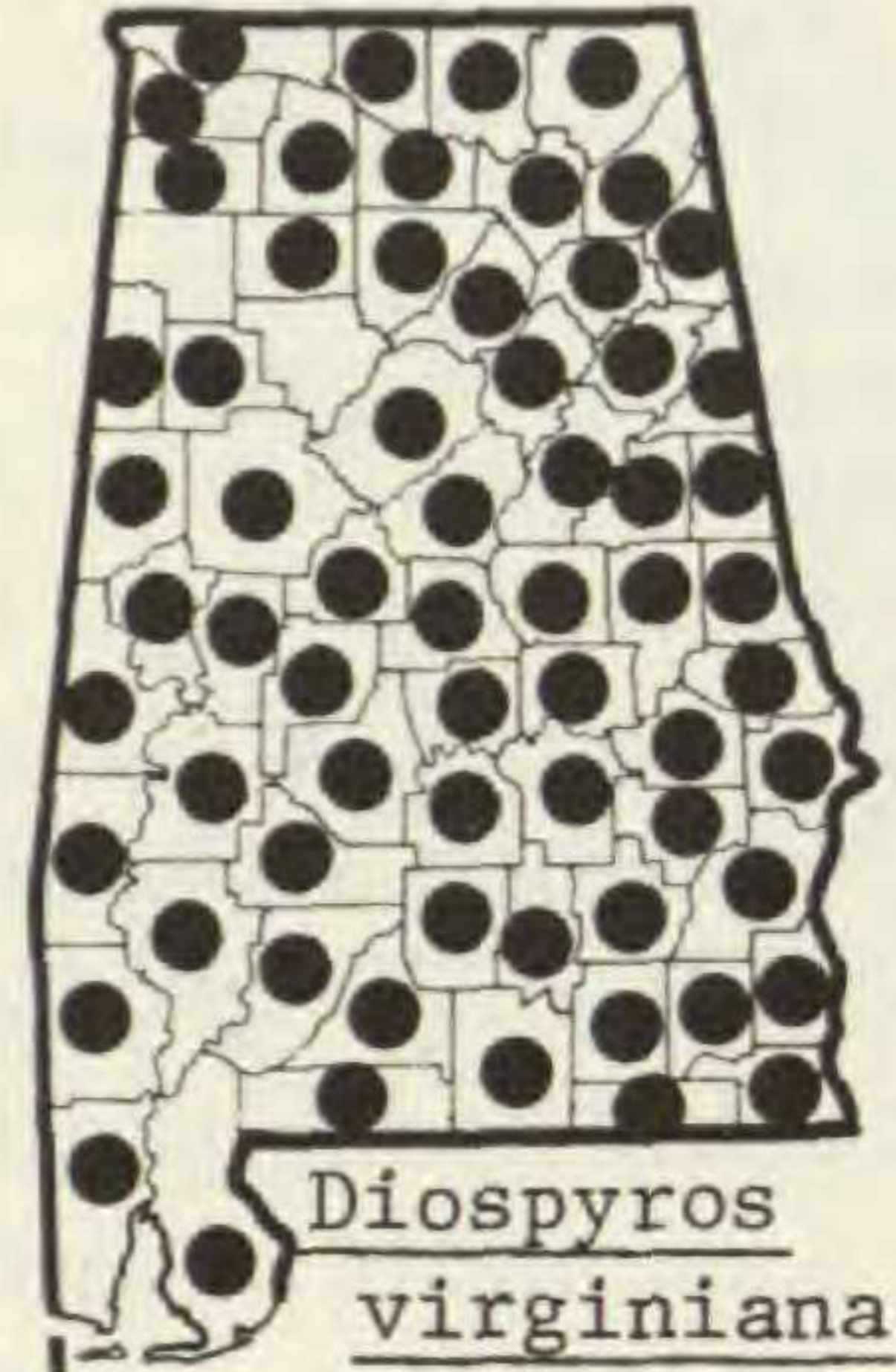
### 1. *Bumelia* Swartz

- |  |                         |
|--|-------------------------|
| 1. Leaves tomentose beneath .....                      | 1. <i>B. lanuginosa</i> |
| 1. Leaves glabrous beneath, at least at maturity ..... | 2. <i>B. lycioides</i>  |

60. SAPOTACEAE



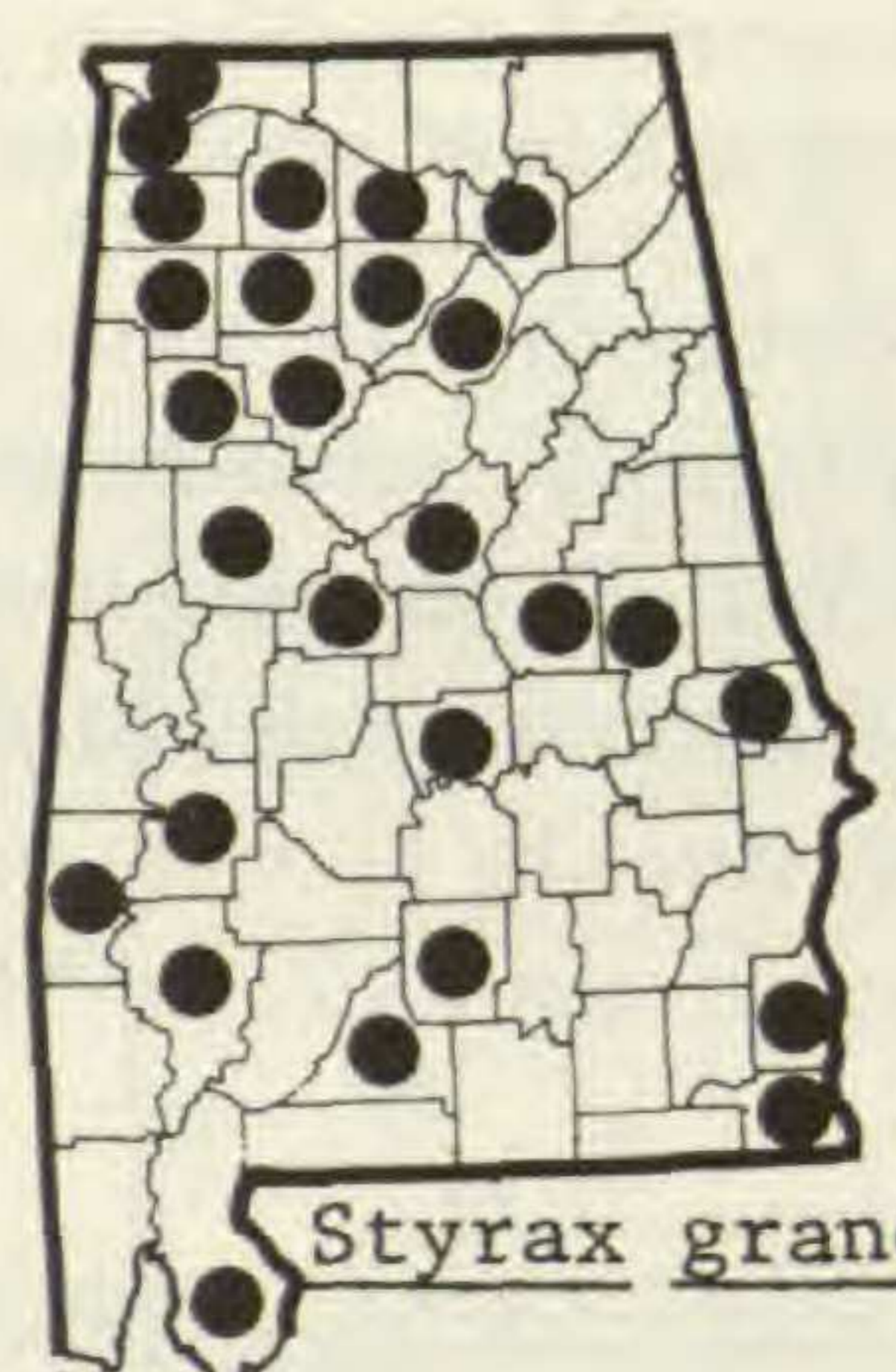
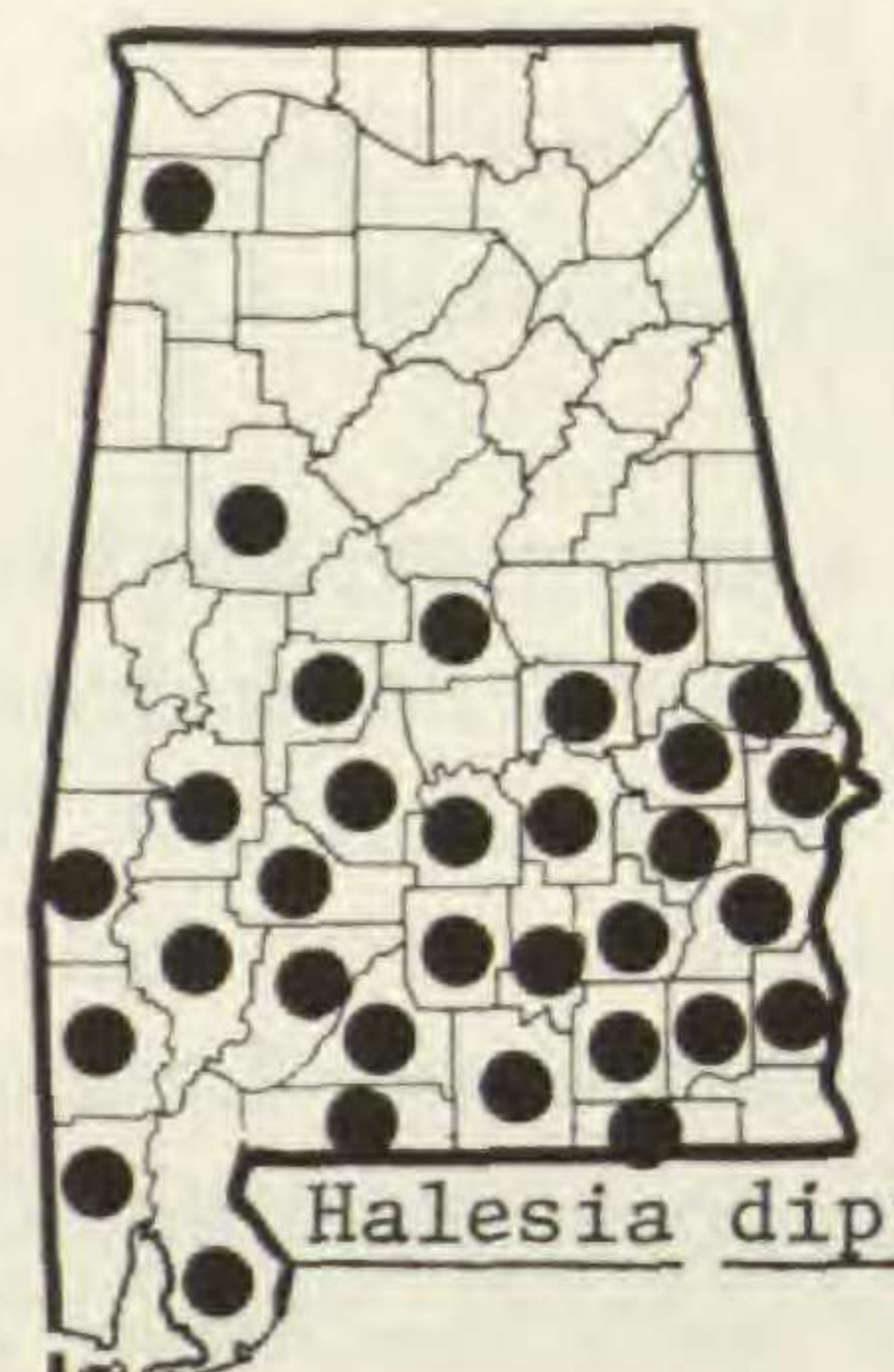
61. EBENACEAE



62. SYMPLOCACEAE



63. STYRACACEAE





1. *B. lanuginosa* (Michaux) Persoon. Late spring-early summer; late summer-fall. Thickets, mesic or alluvial woods; principally CP.

2. *B. lycioides* (L.) Gaertner. Late spring-summer; fall. Thickets, rich or alluvial woods, usually in circumneutral soil; CP, AM, VR, CuP, HR.

Alabama is considered by Small (1933) to be within the range of *Bumelia reclinata* Vent.

#### 61. EBENACEAE

##### 1. *Diospyros* L., PERSIMMON

1. *D. virginiana* L. Spring; late summer-fall. Woodlands, thickets, fields; throughout.

#### 62. SYMPLOCACEAE

##### 1. *Symplocos* Jacquin

1. *S. tinctoria* (L.) L'Her, HORSE-SUGAR, SWEET-LEAF, SWEET BAY. Spring; summer. Rich or alluvial woods, infrequent; throughout.

#### 63. STYRACACEAE

- |  |                   |
|--|-------------------|
| 1. Corolla lobes 4; fruit winged .....   | 1. <i>Halesia</i> |
| 1. Corolla lobes 5; fruit wingless ..... | 2. <i>Styrax</i>  |

##### 1. *Halesia* Ellis ex L., SILVERBELL

- |   |                         |
|---|-------------------------|
| 1. Corolla lobes shorter than corolla tube; wings of fruit subequal .....   | 2                       |
| 2. Corolla less than 1.5 cm long; fruit clavate .....   | 3. <i>H. parviflora</i> |
| 2. Corolla 1.5 cm long or longer; fruit ellipsoid to obovoid .....  | 1. <i>H. carolina</i>   |
| 1. Corolla lobes longer than corolla tube; one pair of fruit wings 2 or more times as wide as the other pair of wings ..... | 2. <i>H. diptera</i>    |

1. *H. carolina* L. Spring; summer. Alluvial or rich upland woods; throughout, but infrequent to the south and westward. *Mohrodendron carolinum* (L.) Britt.—M.

2. *H. diptera* Ellis. Spring; summer. Bluffs, mesic woods; CP and adjacent P, AM, CuP. *Mohrodendron dipterum* (L.) Britt.—M.—*Halesia diptera* Ell. var. *magniflora* Godfrey is infrequent in the CP.

3. *H. parviflora* Michaux. Spring; summer. Mesic woods; CP.

##### 2. *Styrax* L.

- |  |                          |
|--|--------------------------|
| 1. Leaves stellate-pubescent over the lower surfaces; racemes 5- or more-flowered .....  | 2. <i>S. grandifolia</i> |
| 1. Leaves glabrous beneath, or sparsely stellate-pubescent only on the principal veins; racemes 4- or less-flowered, or flowers solitary ..... | 1. <i>S. americana</i>   |

1. *S. americana* Lamarck. Spring; summer. Swamp forests, alluvial and low woods and thickets, more frequent southeastward; CP, P, AM, VR (rare). *S. pulverulenta* Michx.—M, H, S.

2. *S. grandifolia* Aiton. Spring; summer. Ravines, mesic slopes; CP, P, CuP, HR.

## 64. OLEACEAE

- |  |                       |
|--|-----------------------|
| 1. Leaves pinnately compound .....   | 3. <i>Fraxinus</i>    |
| 1. Leaves simple .....   | 2                     |
| 2. Leaves serrate or crenate .....   | 2. <i>Forestiera</i>  |
| 2. Leaves entire .....   | 3                     |
| 3. Petals linear, united only at base; leaves deciduous .....                                    | 1. <i>Chionanthus</i> |
| 3. Petals united into a salverform or funnelform corolla; leaves evergreen or partially so ..... | 4                     |
| 4. Inflorescences axillary .....   | 5. <i>Osmanthus</i>   |
| 4. Inflorescence terminal .....  | 4. <i>Ligustrum</i>   |

1. *Chionanthus* L., GRANDSIR GRAYBEARD, FRINGE TREE

1. *C. virginicus* L. Spring; summer. Rocky or dry woods, bluffs; throughout. Widely transplanted as an ornamental.

2. *Forestiera* Poiret

- |  |                         |
|--|-------------------------|
| 1. Leaves gradually acuminate; fruit 2 or more times longer than broad ..... | 1. <i>F. acuminata</i>  |
| 1. Leaves obtusely acuminate; fruit less than 2 times as long as broad ..... | 2. <i>F. ligustrina</i> |

1. *F. acuminata* (Michaux) Poiret. Spring. Swamp forests, river banks, local and rare; CP, reported from HR. *Adelia acuminata* Michx.—M, H.

2. *F. ligustrina* (Michaux) Poiret. Summer; late summer-fall. Dry woods and thickets, local and infrequent; CP (rare), VR (rare), P, CuP, HR. *F. pubescens* Nutt.—S; *Adelia ligustrina* Michx.—M, H.

3. *Fraxinus* L., ASH

- |  |                            |
|--|----------------------------|
| 1. Twigs 4-angled or 4-winged .....  | 4. <i>F. quadrangulata</i> |
| 1. Twigs not winged .....  | 2                          |
| 2. Samara winged to the base, its body flattened .....   | 2. <i>F. caroliniana</i>   |
| 2. Samara not winged to the base, its body terete .....  | 3                          |
| 3. Samara body usually less than 12 mm long, its wing decurrent less than $\frac{1}{3}$ of body length ..... | 1. <i>F. americana</i>     |
| 3. Samara body usually more than 12 mm long, its wing decurrent more than $\frac{1}{3}$ of body length ..... | 4                          |
| 4. Samara body more than 2 mm broad .....  | 5. <i>F. tomentosa</i>     |
| 4. Samara body less than 2 mm broad .....  | 3. <i>F. pennsylvanica</i> |

Except for species 4, staminate or sterile material is impossible to determine satisfactorily.

1. *F. americana* L., AMERICAN A., WHITE A. Spring; summer-fall.

- |  |   |
|--|---|
| 1. Twigs, petioles and lower surfaces of leaflets glabrous or glabrate ..... | <i>F. americana</i> var. <i>americana</i>   |
| 1. Twigs, petioles and lower surfaces of leaflets densely pubescent .....    | <i>F. americana</i> var. <i>biltmoreana</i> |

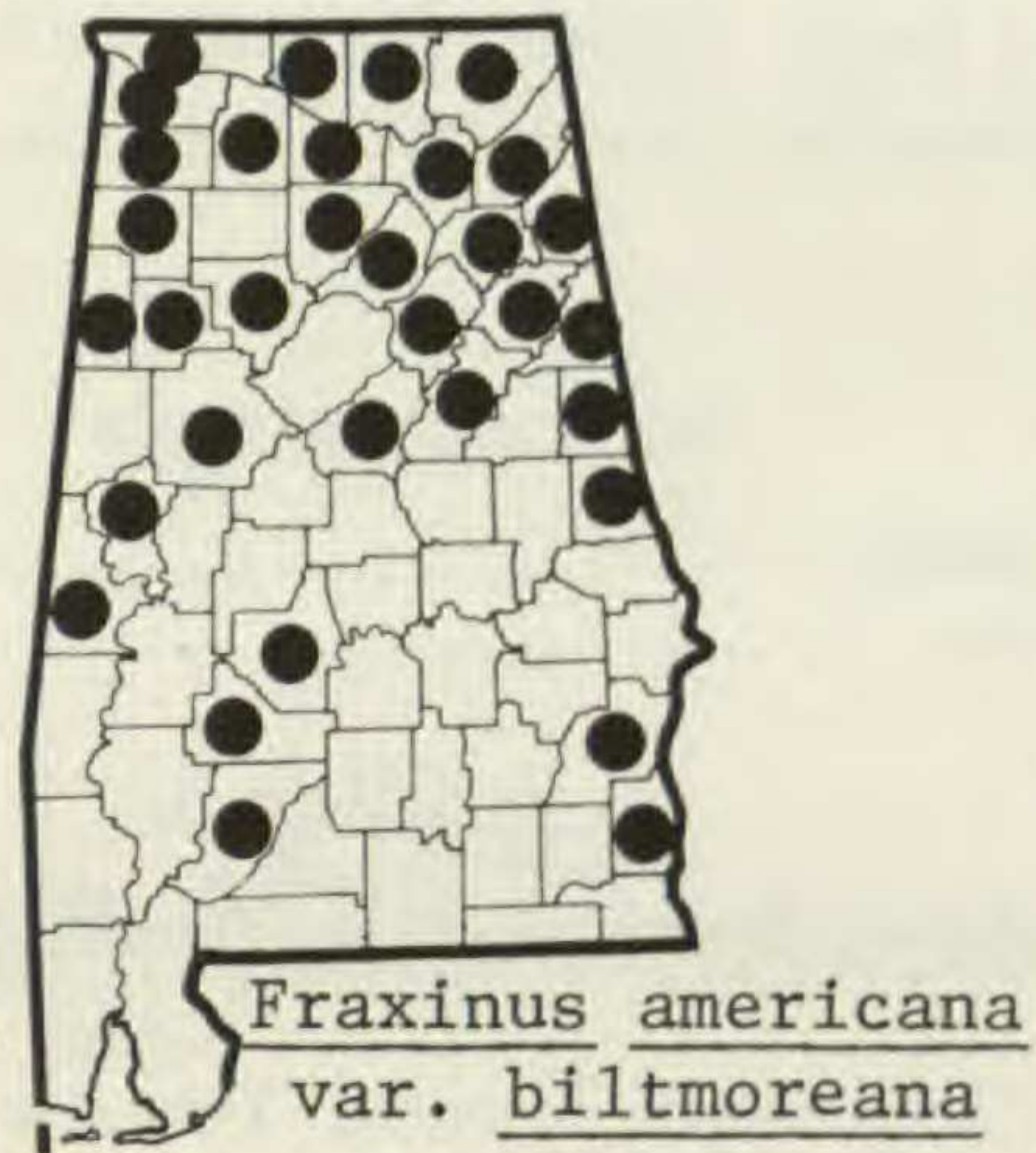
*F. americana* L. var. *americana*. Rich or low woods, infrequent to rare; throughout. *F. americana curtissii* (Vasey) Sudw.—M.

*F. americana* L. var. *biltmoreana* (Beadle) Wright ex Fernald. Dry, rich, or low woods; throughout, becoming rare southward. *F. biltmoreana* Bead.—M, S.

2. *F. caroliniana* Miller. Spring; summer-fall. Swamp forests; CP. *F. pauciflora* Nutt.—S.

3. *F. pennsylvanica* Marshall, GREEN A. Spring; summer-fall. Low thickets

64. OLEACEAE



and woods; CP, P, VR, CuP. *F. lanceolata* Borkh.—M, H; *F. darlingtonii* Britt., *F. smallii* Britt.—S.

4. *F. quadrangulata* Michaux, BLUE A. Flowers, fruits not seen. Rich or open woods over calcareous rock, local; CuP, HR.

5. *F. tomentosa* Michaux f. Credited to Alabama by Small (1933), and by Radford in Radford, Ahles and Bell (1968). *F. michauxii* Britt., *F. profunda* Bush—S.

#### 4. *Ligustrum* L., PRIVET

1. Twigs glabrous ..... 1. *L. japonicum*  
 1. Twigs pubescent ..... 2. *L. sinense*

1. *L. japonicum* Thunberg. Spring; fall–winter. Occasional escape to fence-rows, roadsides; CP, VR.

2. *L. sinense* Loureiro. Spring; fall–winter. Escaped to roadsides, fields and woods; throughout.

#### 5. *Osmanthus* Loureiro

1. *O. americana* (L.) Gray. Spring; late summer–winter. Bluffs, mesic woods; CP and adjacent P. *Amarolea americana* (L.) Sm.—S; *O. americana* (L.) B. & H.—M, H.

### 65. LOGANIACEAE

1. Leaves serrate; plant a shrub ..... 1. *Buddleja*  
 1. Leaves entire; plant a vine ..... 2. *Gelsemium*

#### 1. *Buddleja* L.

1. *B. lindleyana* Fortune. Summer–fall. Waste ground, rare; P.

#### 2. *Gelsemium* Jussieu, YELLOW JASMINE

1. Calyx lobes acute; flowers odorless; capsule beak more than 2 mm long; seeds wingless ..... 1. *G. rankinii*  
 1. Calyx lobes obtuse; flowers fragrant; capsule beak less than 2 mm long; seeds winged ..... 2. *G. sempervirens*

1. *G. rankinii* Small. Spring; late summer–fall. Low, acidic ground, infrequent; OCP.

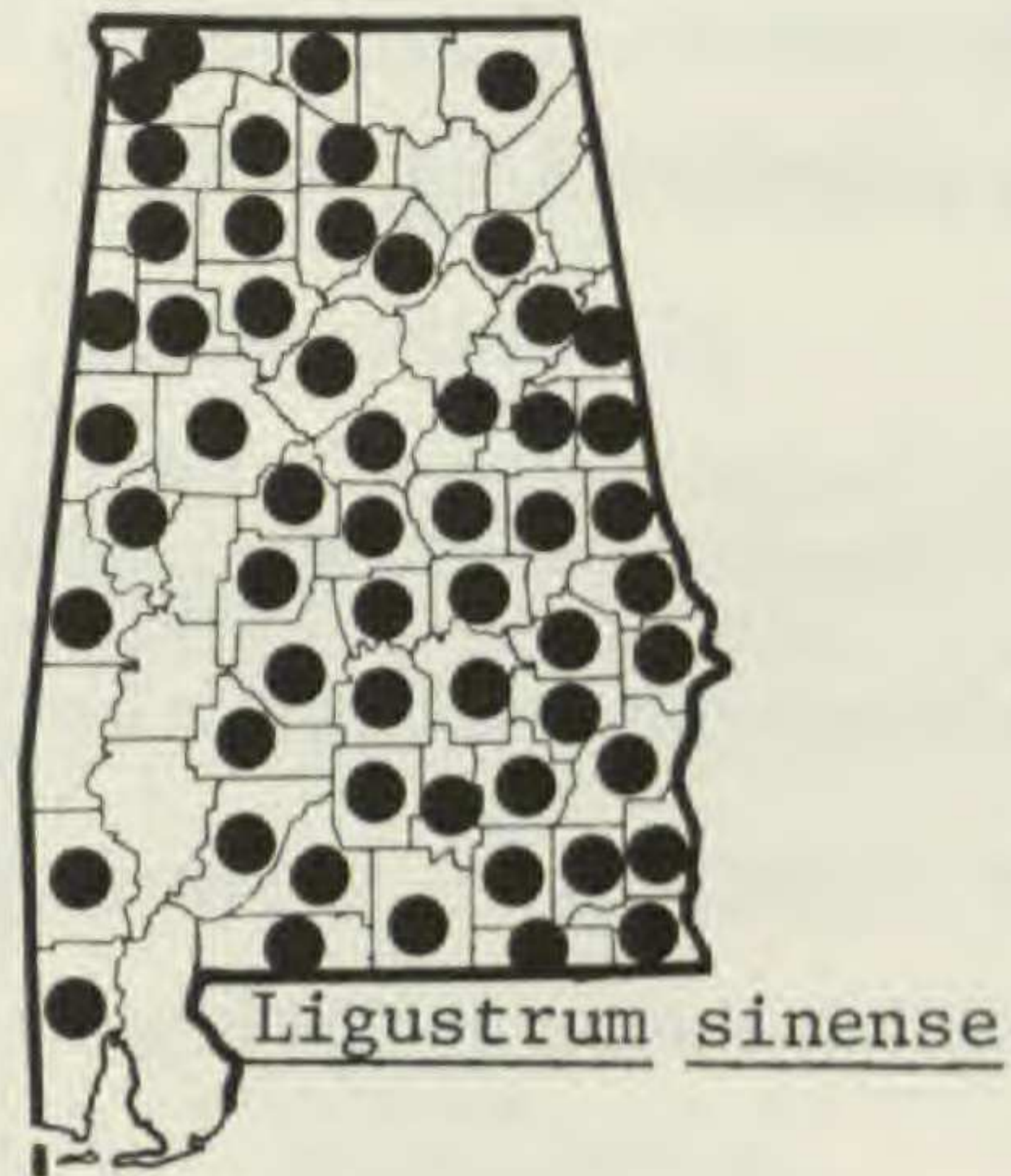
2. *G. sempervirens* (L.) Aiton f. Spring; late summer–fall. Roadsides, fence-rows, openings in woods; CP, P, AM, VR (rare), CuP.

### 66. APOCYNACEAE

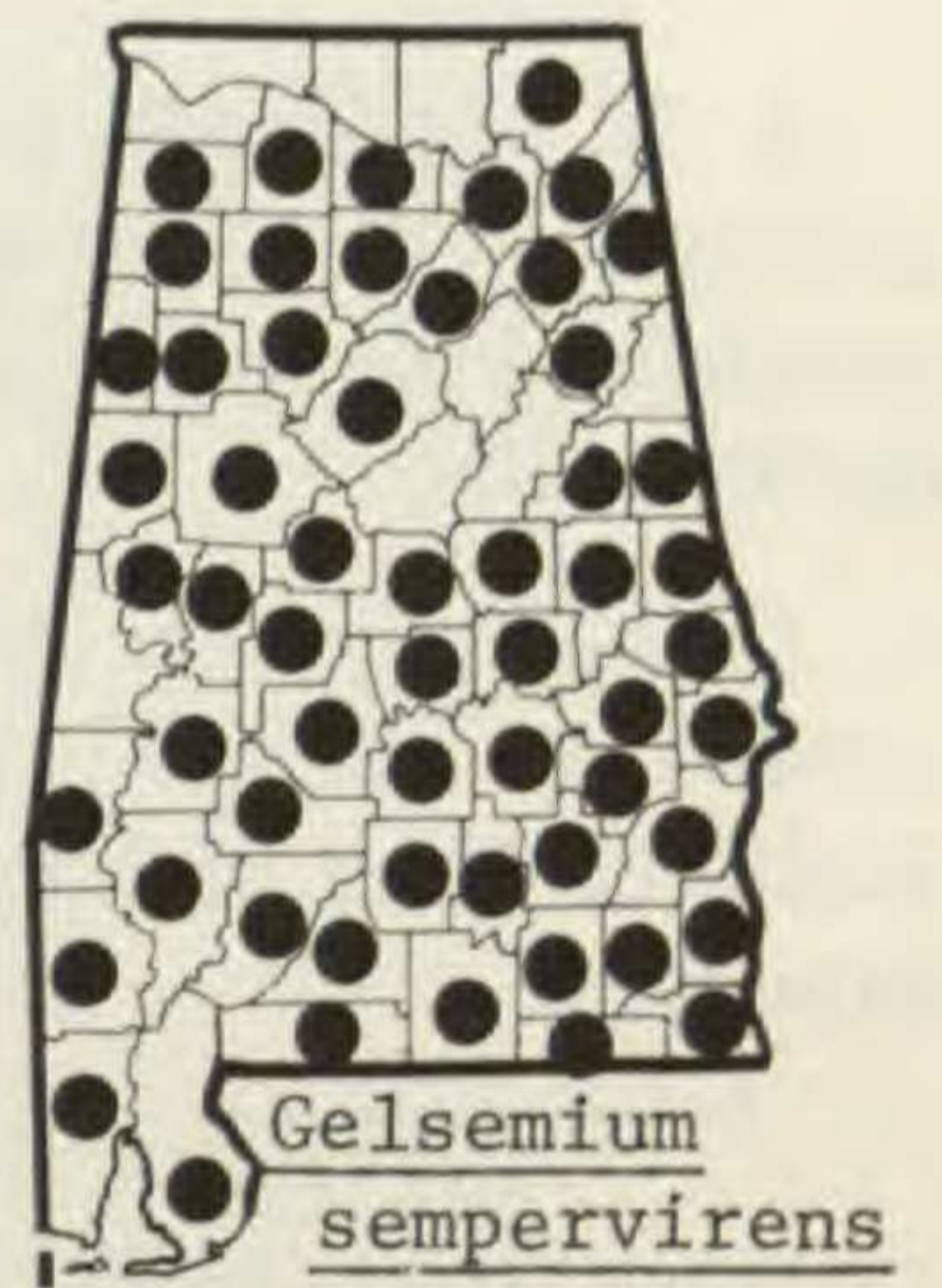
1. Leaves abruptly acuminate; corolla 10 mm or less long, less than 10 mm broad, yellow ..... 1. *Trachelospermum*  
 1. Leaves obtuse to acute; corolla more than 10 mm broad and long, bluish or white ..... 2. *Vinca*

#### 1. *Trachelospermum* Lemaire

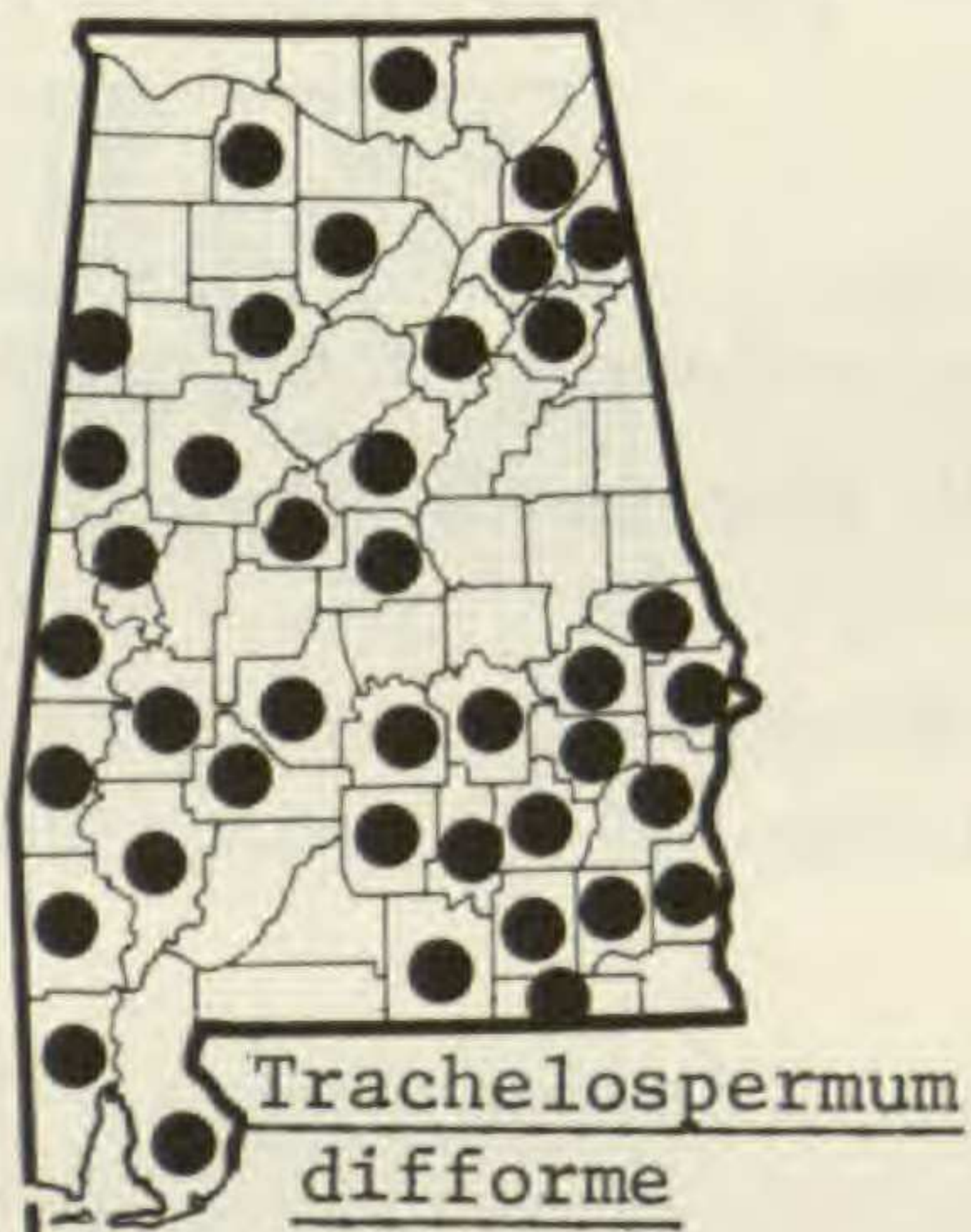
1. *T. difforme* (Walter) Gray. Late spring–early summer; late summer–fall. Swamps, low woods and thickets; CP, VR, CuP, HR.



65. LOGANIACEAE



66. APOCYNACEAE



67. VERBENACEAE



2. *Vinca* L., PERIWINKLE

1. *V. minor* L. Spring; summer. A rare escape to low woods; P, VR.

*Nerium oleander* L. is a doubtful OCP escape. It persists from cultivation.

## 67. VERBENACEAE

- |  |                      |
|--|----------------------|
| 1. Inflorescence spicate; fruit of nutlets enclosed by calyx .....           | 3. <i>Verbena</i>    |
| 1. Inflorescence racemose or corymbose; fruit fleshy, a drupe or berry ..... | 2                    |
| 2. Corolla orange, yellow or reddish; fruit a blue to black drupe .....      | 2. <i>Lantana</i>    |
| 2. Corolla white, pink or lavender; fruit a lavender berry .....             | 1. <i>Callicarpa</i> |

1. *Callicarpa* L., BEAUTY-BERRY

1. *C. americana* L. Spring-summer; late summer-fall. Rocky or sandy woods, thickets; throughout.

2. *Lantana* L.

1. *L. camara* L. Spring-fall. Rare escape to roadsides and waste places; CP.

3. *Verbena* L.

1. *V. brasiliensis* Vellozo. Spring-fall. Fields, alluvial woods, waste places; principally CP.—This species is usually considered herbaceous, but stems become woody and persistent in Alabama. It was poorly collected during the field work for this study.

*Clerodendron* sp. has been reported as an escape by Dean (1961) and *Vitex agnus-castus* L. has been attributed to Alabama by Dean (1961) and by Bell in Radford, Ahles and Bell (1968). Verification of these as escaped awaits confirmation.

## 68. LAMIACEAE

- |  |                     |
|--|---------------------|
| 1. Leaves linear, densely hoary-canescant .....      | 1. <i>Conradina</i> |
| 1. Leaves ovate to oblanceolate, not canescant ..... | 2. <i>Satureja</i>  |

1. *Conradina* Gray

1. *C. canescens* (Torrey & Gray) Gray. Summer-fall. Sandy woods; OCP.

2. *Satureja* L.

- |   |                        |
|---|------------------------|
| 1. Corolla more than 2.5 cm long, scarlet; calyx 8 mm long or longer .....          | 1. <i>S. coccinea</i>  |
| 1. Corolla less than 2 cm long, white or purplish; calyx 6 mm long or shorter ..... | 2. <i>S. georgiana</i> |

1. *S. coccinea* (Nuttall) Benth. Late summer-fall. Dry woods, local; OCP. *Clinopodium coccineum* (Nutt.) Kuntze—M, H, S.

2. *S. georgiana* (Harper) Ahles. Summer-fall. Rocky or sandy woods, local; CP, CuP, AM. *Clinopodium carolinianum* (Walt.) Kuntze—M; *C. georgianum* Harper—H, S.

## 69. SOLANACEAE

1. *Lycium* L.

1. *L. carolinianum* Walter. Summer-fall. Reported from OCP by Mohr (1901).

68. LAMIACEAE



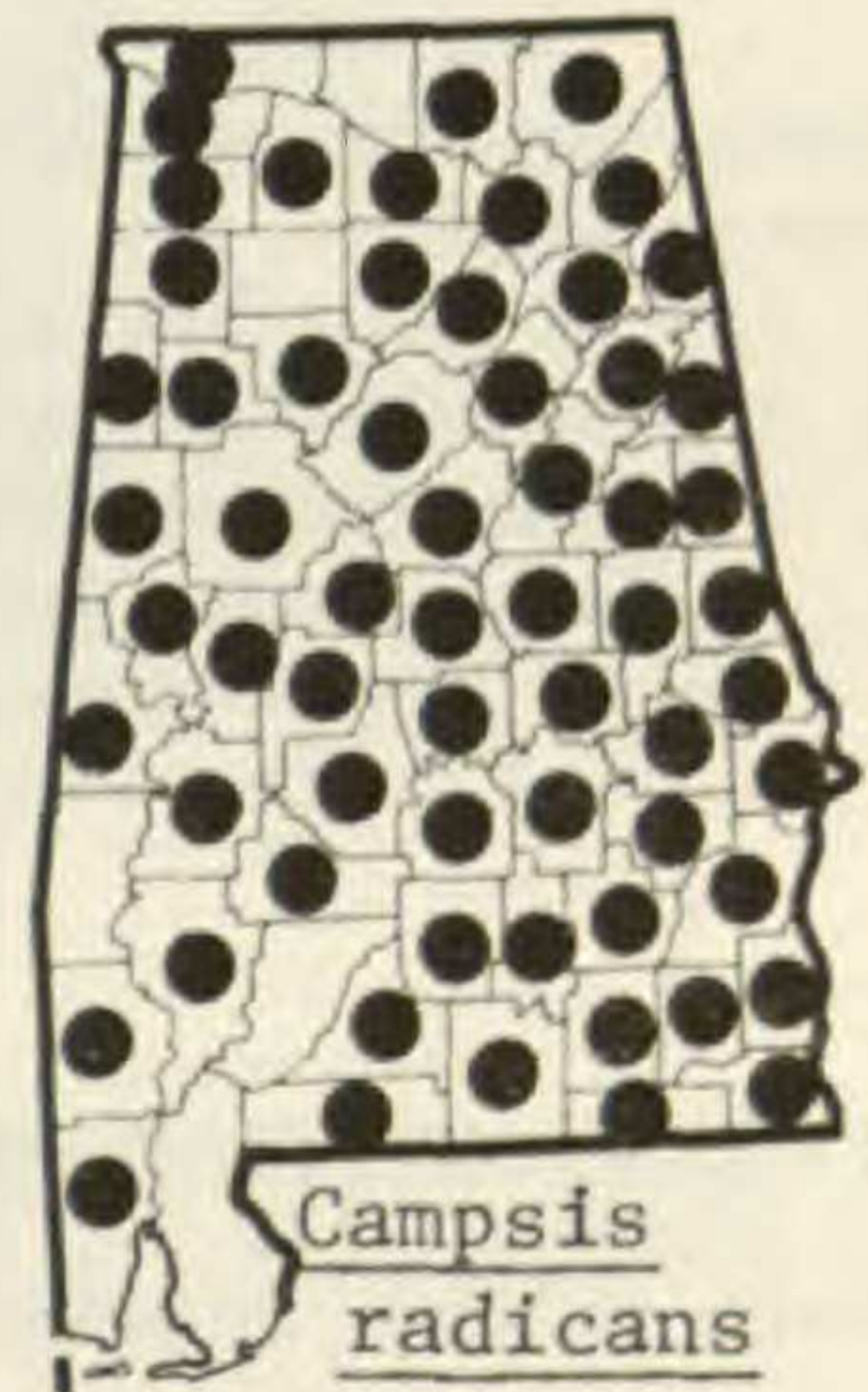
69. SOLANACEAE



70. SCROPHULARIACEAE



71. BIGNONIACEAE



## 70. SCROPHULARIACEAE

1. *Paulownia* Siebold & Zuccarini

1. *P. tomentosa* (Thunberg) Steudel. Spring; late summer-fall. Fencerows, waste places, escaped; throughout, but more common northward. *P. tomentosa* (Thunb.) Baill.—M.

## 71. BIGNONIACEAE

- |  |                        |
|--|------------------------|
| 1. Leaves compound; plant a vine .....   | 2                      |
| 2. Leaflets 2, entire; leaf rachis terminated by a tendril .....                           | 1. <i>Anisostichus</i> |
| 2. Leaflets 7 or more, serrate-dentate; leaf rachis terminated by a leaflet or leaflets .. | 2. <i>Campsis</i>      |
| 1. Leaves simple; plant a tree .....   | 3. <i>Catalpa</i>      |

1. *Anisostichus* Bureau

1. *A. capreolata* (L.) Bureau, CROSS-VINE. Spring; summer. Woodlands, thickets; throughout. *Bignonia crucigera* L.—M, H; *A. crucigera* (L.) Bureau—S.

2. *Campsis* Loureiro

1. *C. radicans* (L.) Seemann, TRUMPET VINE, COW-ITCH. Late spring-summer; summer-fall. Fencerows, rights-of-way, thickets; throughout.

3. *Catalpa* L., INDIAN CIGAR TREE

1. *C. bignonioides* Walter, complex. Spring; late summer-fall. Fencerows, roadsides, swamp forests; throughout. *C. catalpa* (L.) Karst.—M; *C. speciosa* Warder ex Engelm. in Coult.—S, RAB.—This group is in need of biosystematic study.

## 72. RUBIACEAE

1. *Cephalanthus* L., BUTTONBUSH

1. *C. occidentalis* L. Late spring-early summer; summer-fall. Creek, swamp and pond margins, ditches; throughout.

## 73. CAPRIFOLIACEAE

- |   |                          |
|---|--------------------------|
| 1. Leaves pinnately compound .....  | 3. <i>Sambucus</i>       |
| 1. Leaves simple .....  | 2                        |
| 2. Leaves subtending inflorescence connate-perfoliate; or plant a twining vine .. | 2. <i>Lonicera</i>       |
| 2. Leaves subtending inflorescence not connate-perfoliate; plant not a vine ..... | 3                        |
| 3. Inflorescences axillary .....  | 4. <i>Symphoricarpos</i> |
| 3. Inflorescences terminal .....  | 4                        |
| 4. Corolla funnelform; fruit a capsule .....                                      | 1. <i>Diervilla</i>      |
| 4. Corolla rotate; fruit a drupe .....  | 5. <i>Viburnum</i>       |

1. *Diervilla* Miller

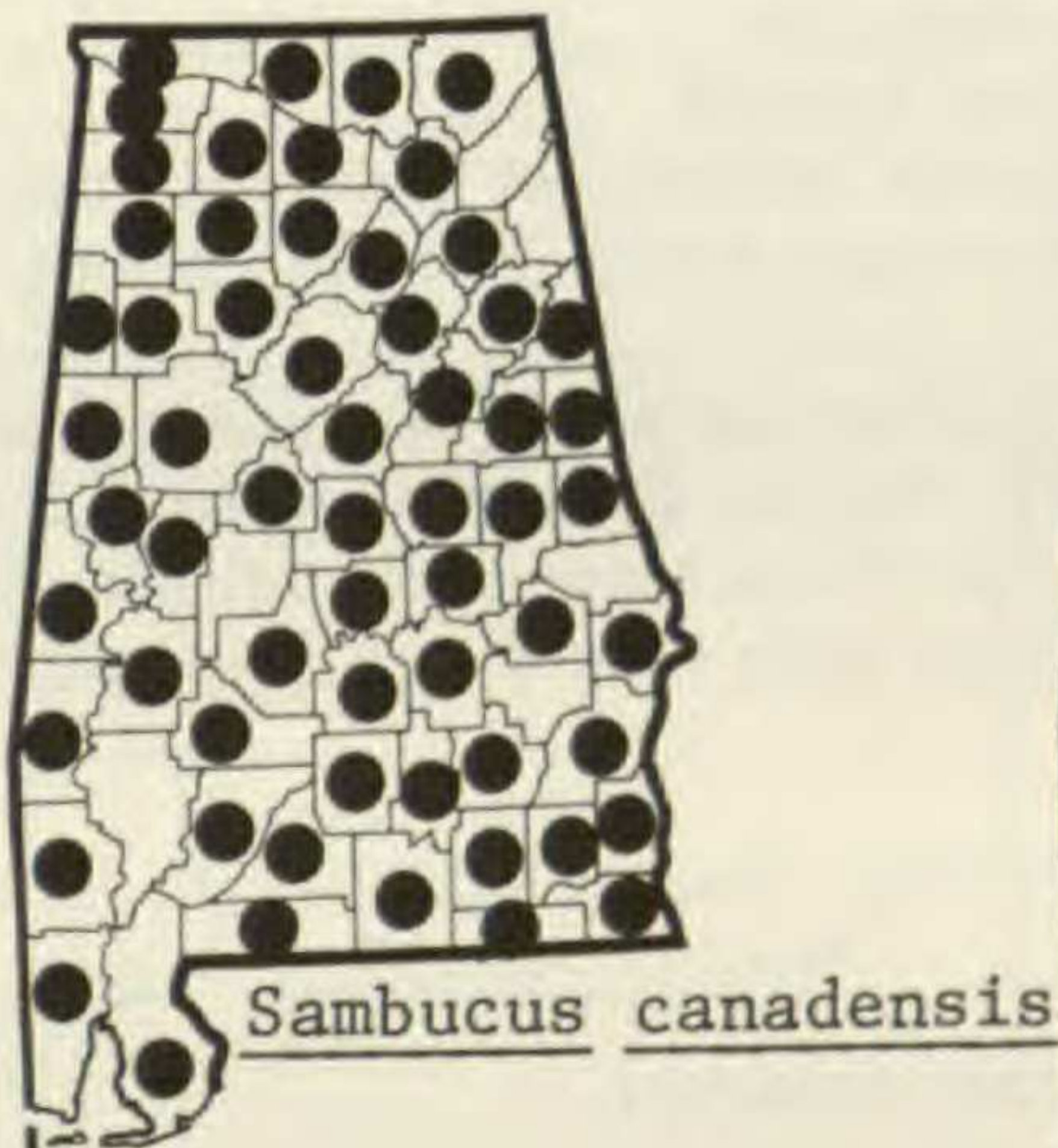
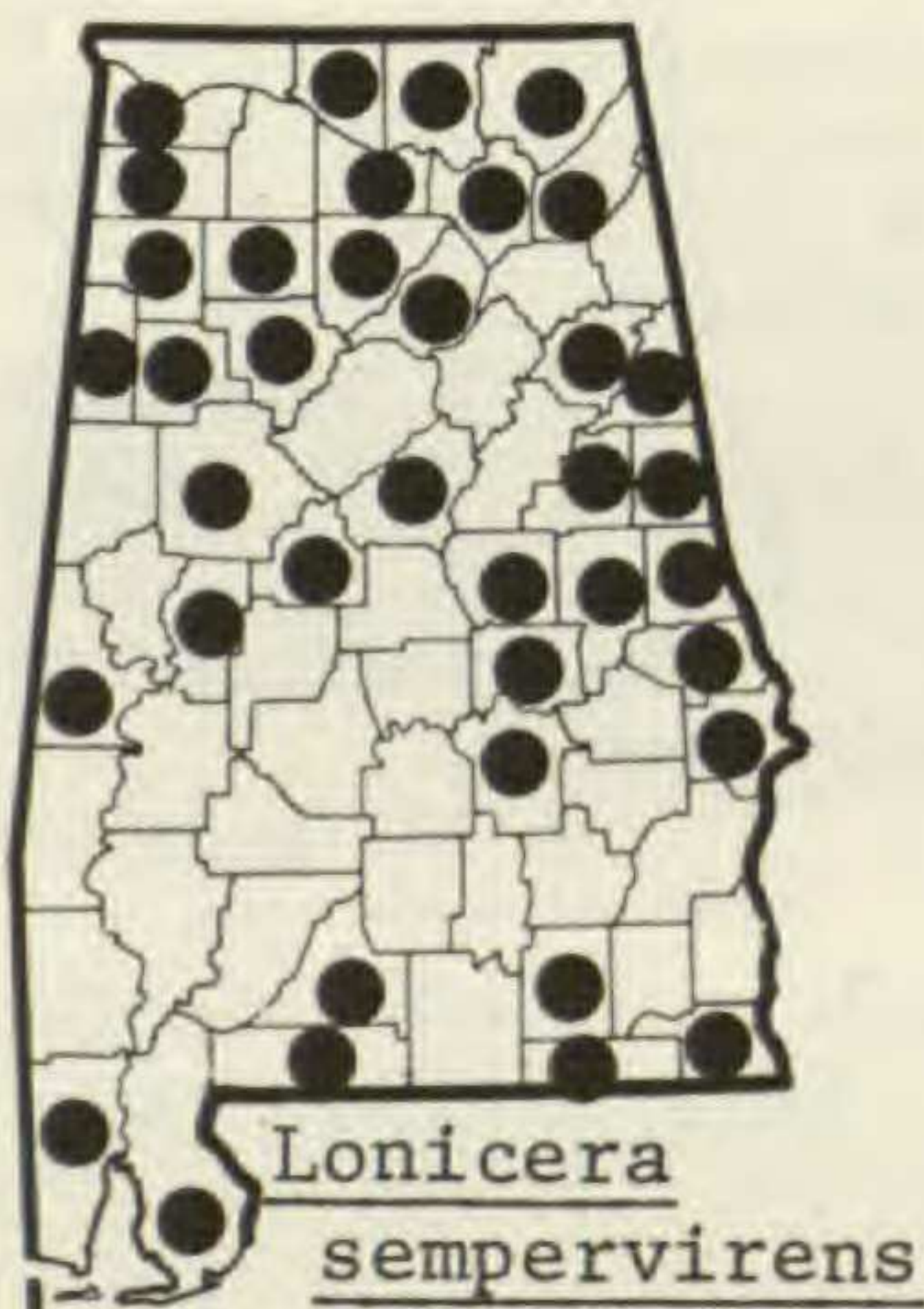
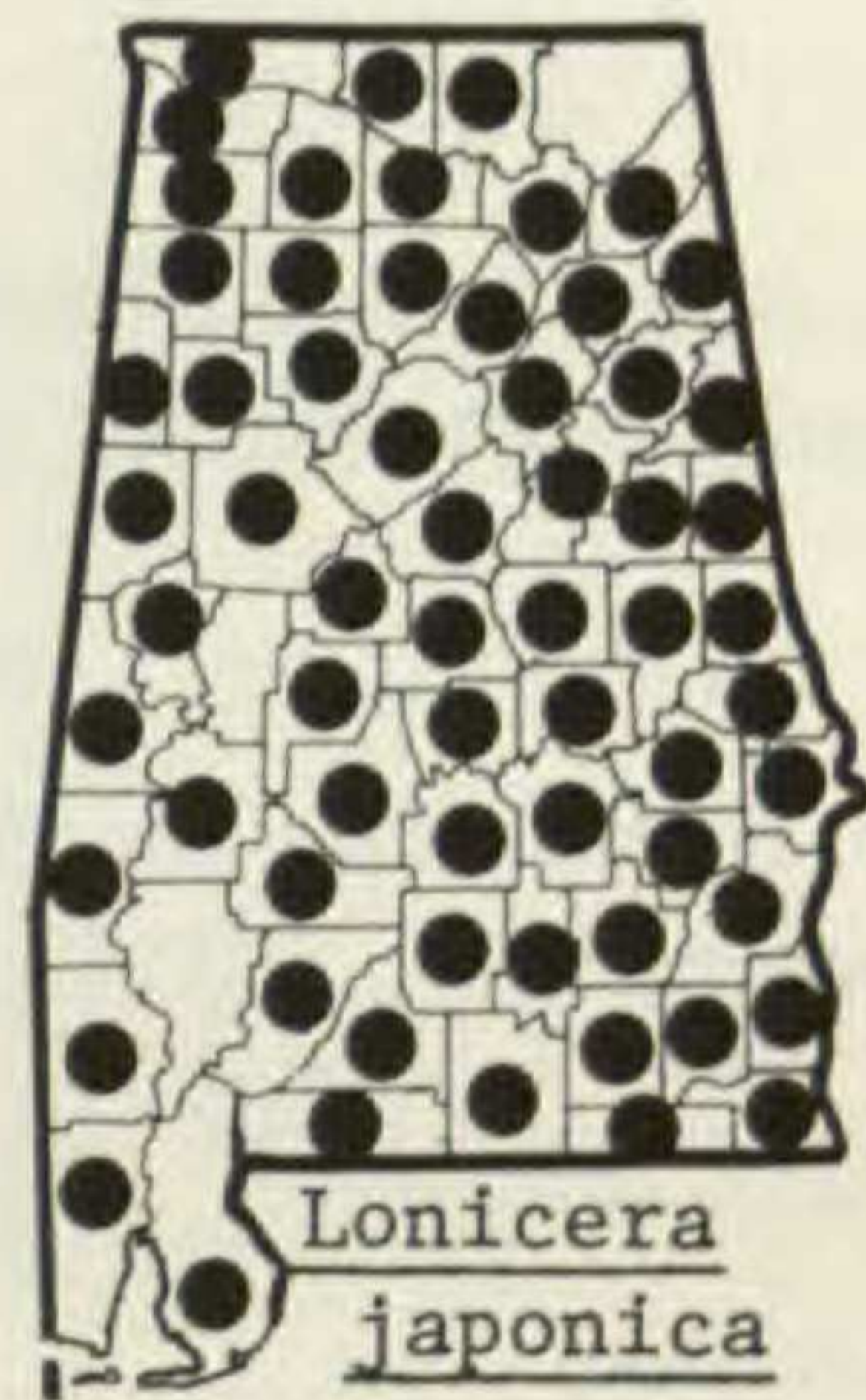
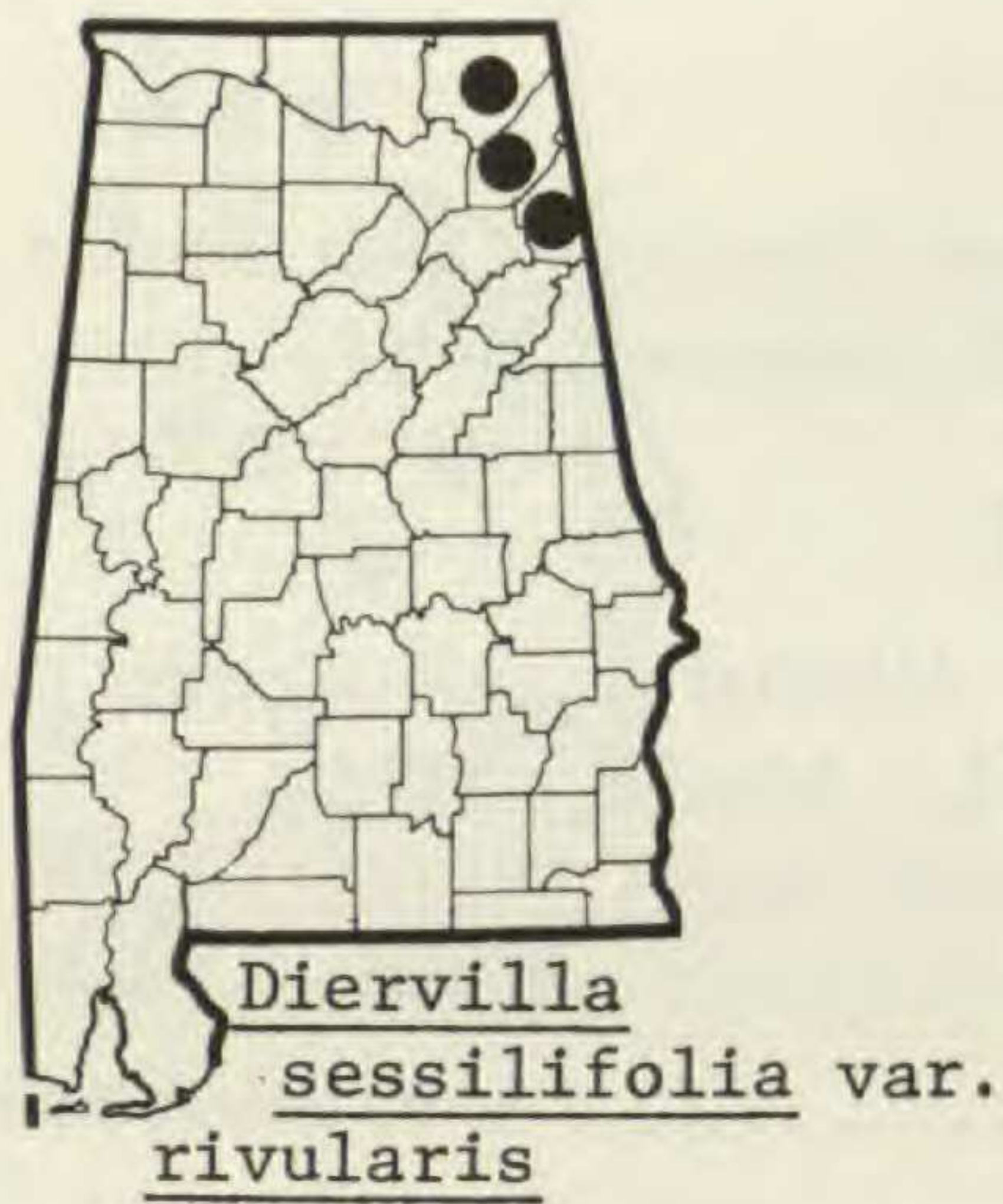
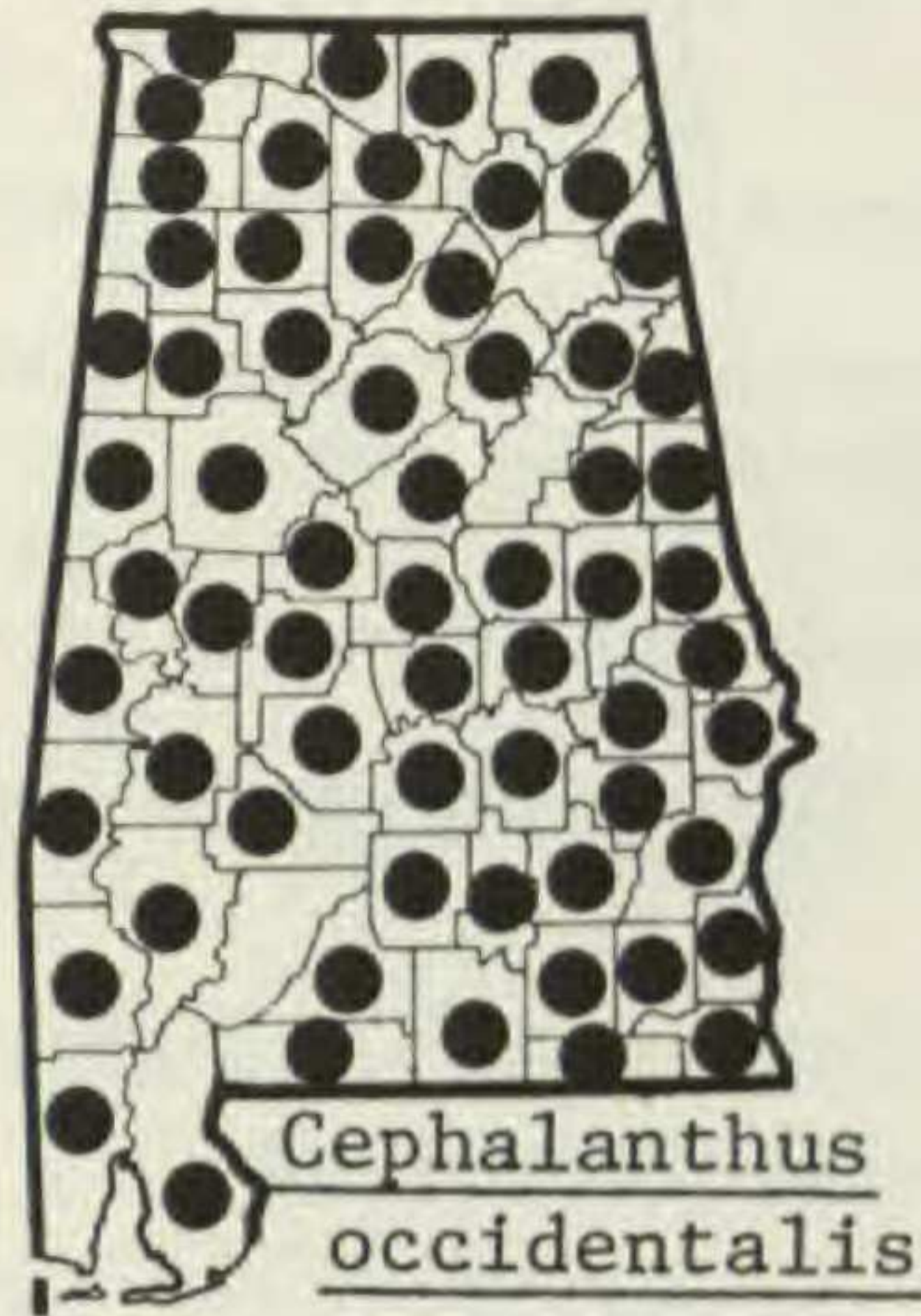
1. *D. sessilifolia* Buckley. Summer; late summer-fall.

- |   |  |
|---|--|
| 1. Twigs glabrous, or pubescent in lines; calyx lobes more than 2 mm long .....               | 1. <i>D. sessilifolia</i> var. <i>sessilifolia</i> |
| 1. Twigs densely pubescent over the entire circumference; calyx lobes 2 mm or less long ..... | 2. <i>D. sessilifolia</i> var. <i>rivularis</i>    |



72. RUBIACEAE

73. CAPRIFOLIACEAE



*D. sessilifolia* Buckley var. *sessilifolia*. Open, rocky woods; CuP.

*D. sessilifolia* Buckley var. *rivularis* (Gattinger) Ahles. Open, rocky woods, northern CuP. *D. rivularis* Gatt.—M, H, S.

## 2. *Lonicera* L., HONEYSUCKLE

1. Inflorescence terminal; leaves subtending inflorescence connate-perfoliate ..... 2  
 2. Corolla yellow to golden, strongly bilabiate ..... 1. *L. flava*  
 2. Corolla red, its lobes subequal ..... 3. *L. sempervirens*  
 1. Inflorescences axillary; leaves subtending inflorescences not connate-perfoliate 2. *L. japonica*

1. *L. flava* Sims, YELLOW H. Spring; summer. Open, rocky woods, rights-of-way; AM, VR, CuP.

2. *L. japonica* Thunberg, COMMON H. Summer; summer-fall. Thickets, roadsides, woodlands, a pesty escape; throughout.

3. *L. sempervirens* L., RED H. Spring-summer. Upland woods, thickets, fence-rows; throughout, but infrequent southward. *Phenianthus sempervirens* (L.) Raf.—S.

*Lonicera longiflora* (Sabine) DC. in Mohr (1901) is of uncertain status.

## 3. *Sambucus* L.

1. *S. canadensis* L., ELDERBERRY. Late spring-summer; summer. Open ditches, low woods, streambanks, pond margins; throughout. *S. simpsonii* Rehd.—S.

## 4. *Symphoricarpos* Duhamel

1. *S. orbiculatus* Moench. Summer; summer-fall. Alluvial or rich woods, in circumneutral soil; VR, CuP, HR. *S. symphoricarpos* (L.) MacM.—M, S.

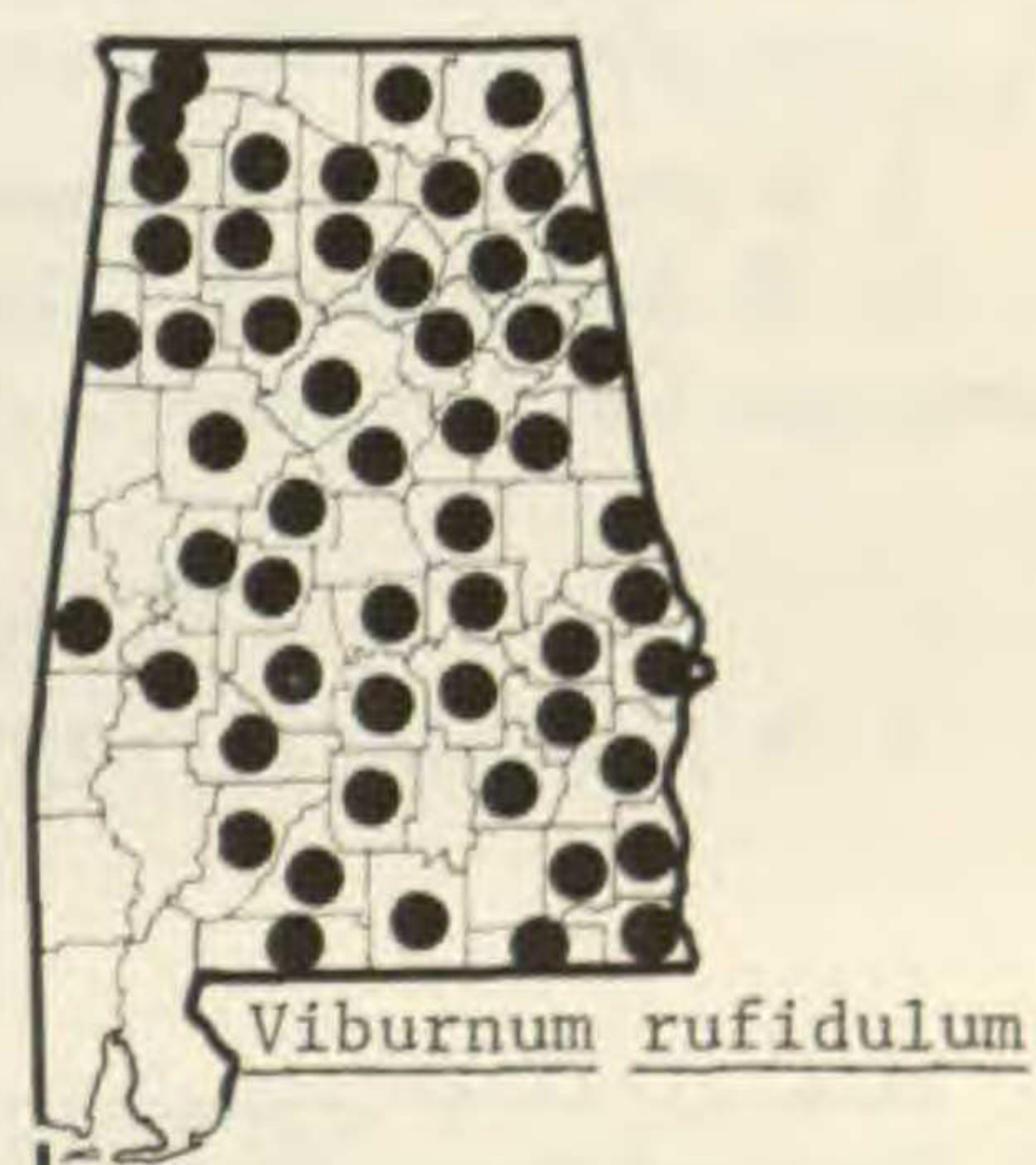
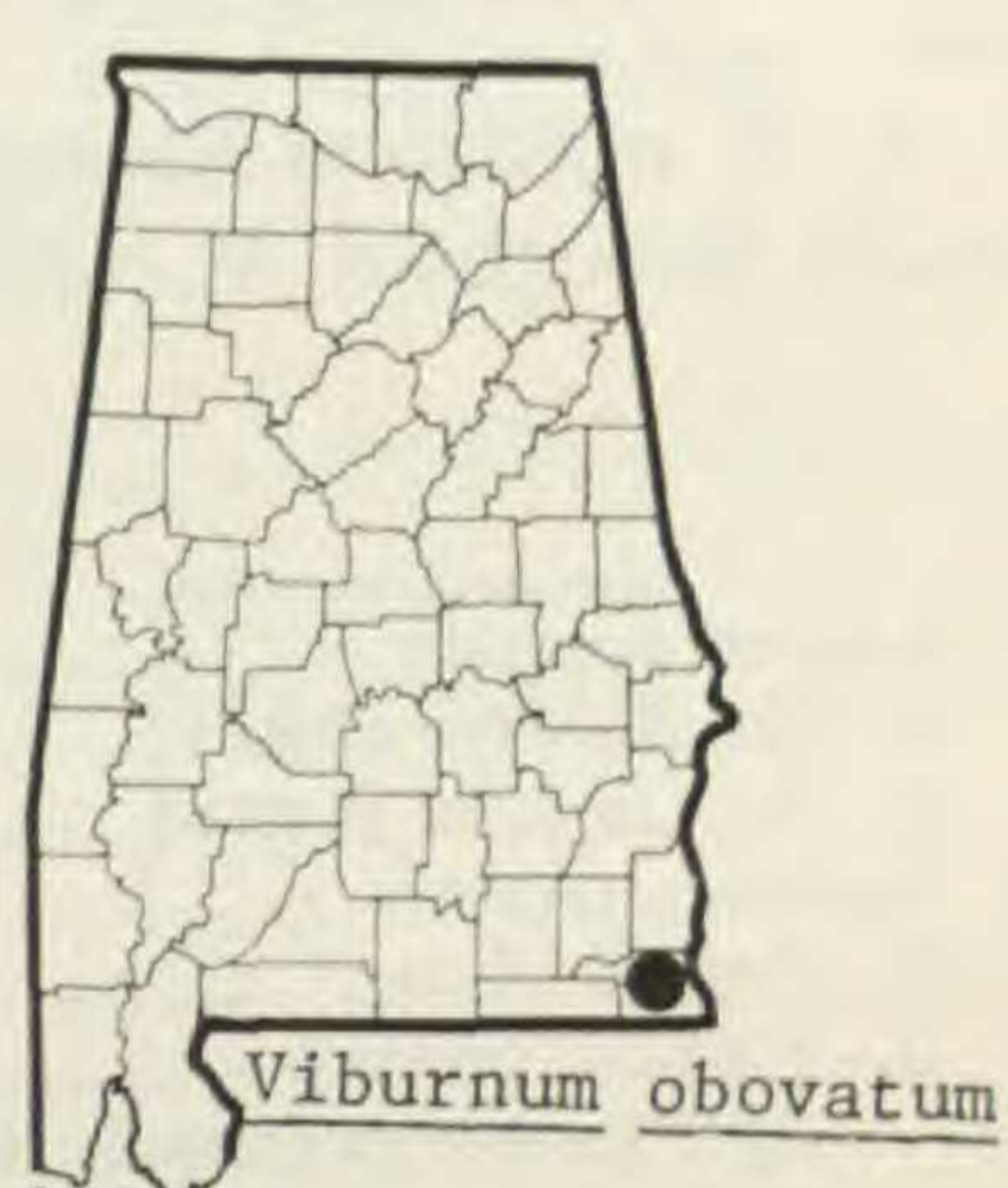
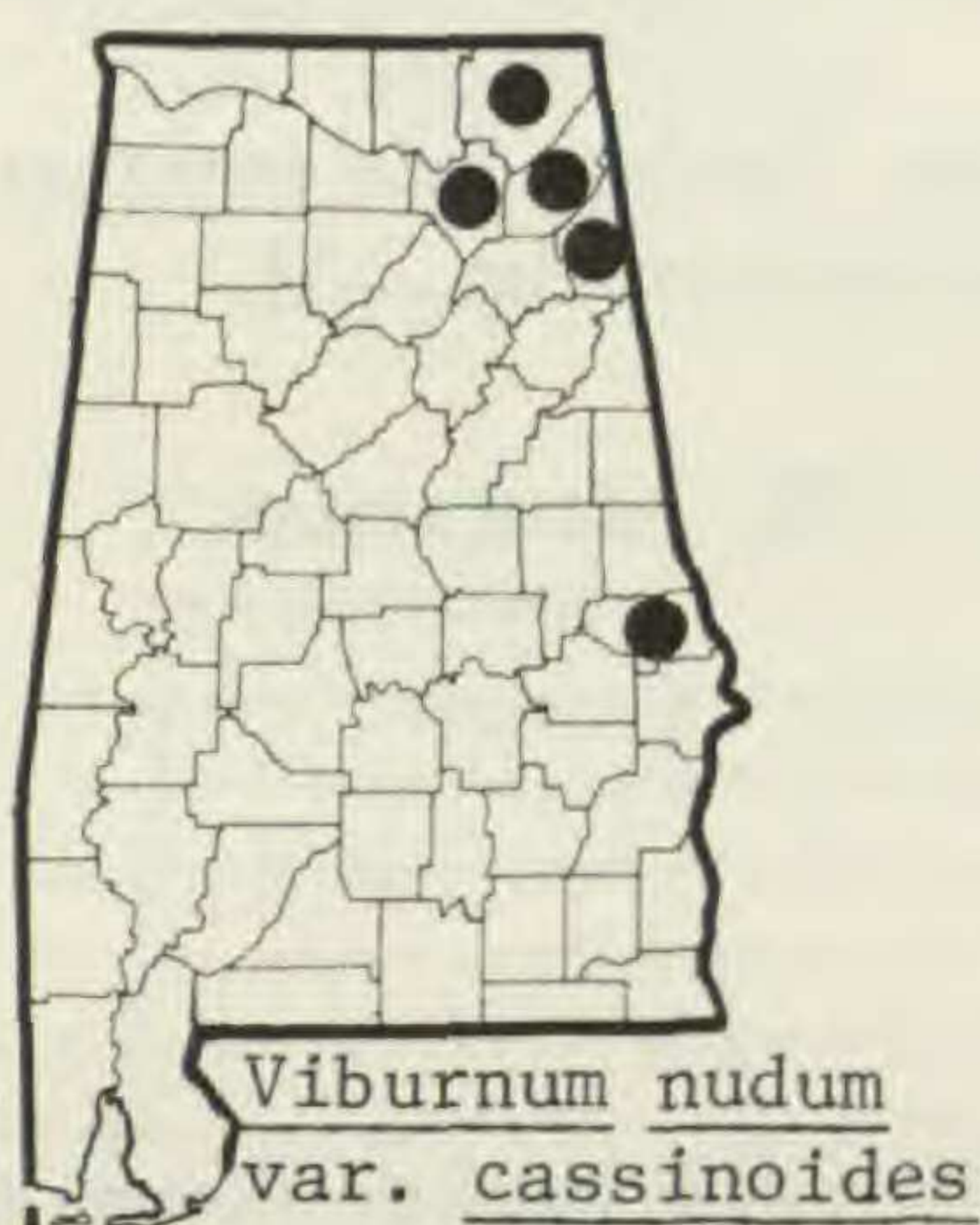
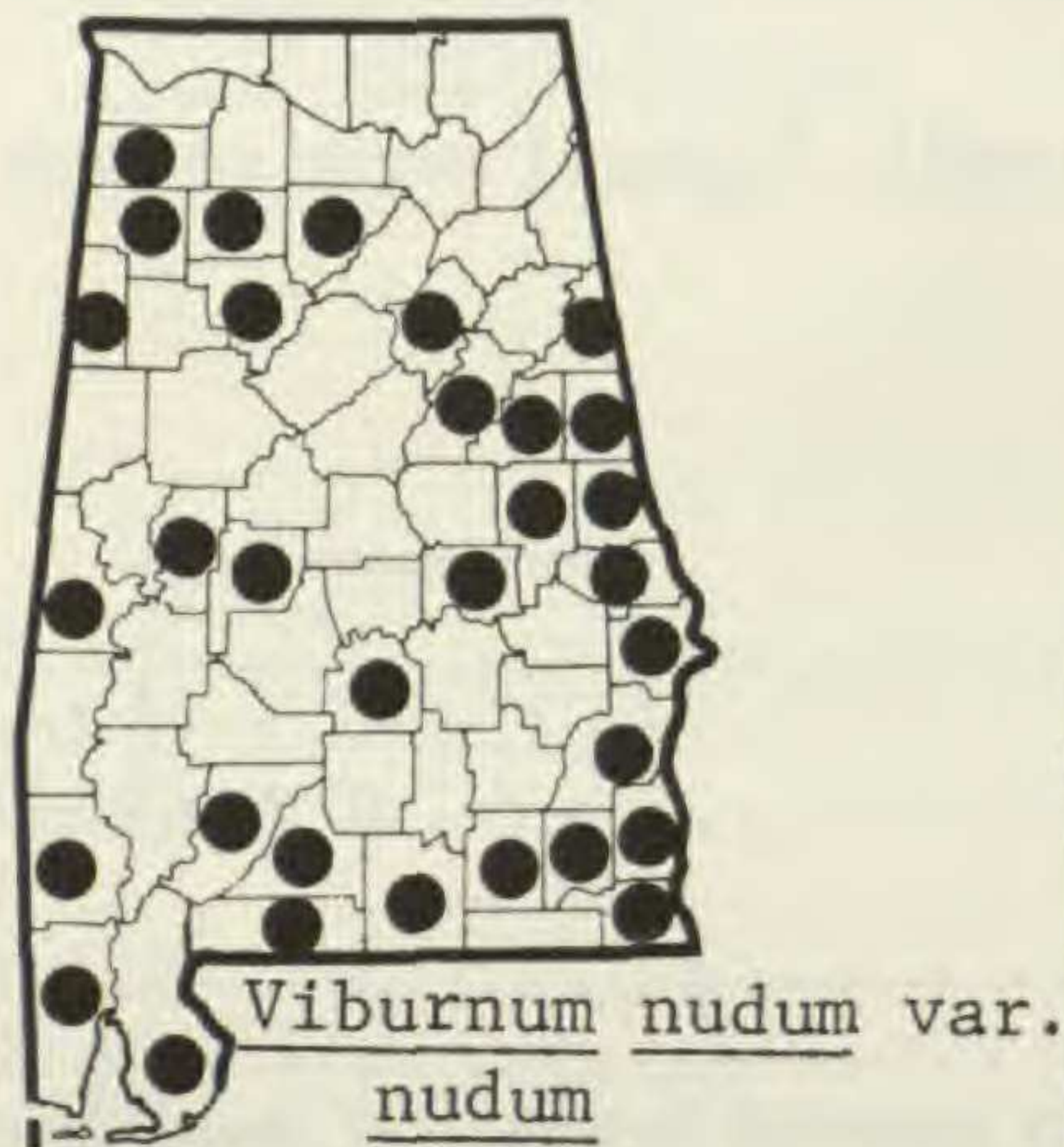
## 5. *Viburnum* L.

1. Leaves lobed ..... 1. *V. acerifolium*  
 1. Leaves not lobed ..... 2  
 2. Leaves crenate, serrate or entire, or dentate and cuneate together ..... 3  
 3. Leaves spatulate to obovate, not acuminate ..... 4. *V. obovatum*  
 3. Leaves elliptic to ovate, usually acuminate ..... 4  
 4. Inflorescence sessile ..... 5. *V. prunifolium*  
 4. Inflorescence pedunculate ..... 5  
 5. Leaves glabrous beneath ..... 3. *V. nudum*  
 5. Leaves pubescent beneath, at least near the margins ..... 6  
 6. Leaf pubescence kinky, floccose, rufous, some trichomes stellate ..... 7. *V. rufidulum*  
 6. Leaf pubescence not kinky, floccose, rufous, or stellate ..... 3. *V. nudum*  
 2. Leaves dentate; rounded, truncate or cordate at base ..... 7  
 7. Petioles of upper leaves 5 mm long or less; stipules present ..... 6. *V. rafinesquianum*  
 7. Petioles of upper leaves more than 5 mm long; stipules usually absent .....  
 ..... 2. *V. dentatum*

1. *V. acerifolium* L. Spring; late summer-fall. Rocky, rich or alluvial woods; CP (rare), AM, VR, CuP.

2. *V. dentatum* L. Spring; summer.

1. Leaves pubescent beneath ..... *V. dentatum* var. *dentatum*  
 1. Leaves glabrous beneath, or pubescence confined to the principal veins and their axils  
 ..... *V. dentatum* var. *lucidum*



*V. dentatum* L. var. *dentatum*. Alluvial woods, swamp forests, principally CP. *V. semitomentosum* (Michx.) Rehd., *V. bracteatum* Rehd.—S, H; *V. molle* Michx.—M.

*V. dentatum* L. var. *lucidum* Aiton. Low woods, alluvial woods; CP (rare), CuP. *V. dentatum* L.—S.

3. *V. nudum* L. Spring; summer-fall.

1. Leaves entire, sinuate or remotely serrate ..... *V. nudum* var. *nudum*  
 1. Leaves, at least some, regularly serrate ..... *V. nudum* var. *cassinoides*

*V. nudum* L. var. *nudum*. Seepages, bogs, swamps, low thickets; CP, P, AM, VR, CuP. *V. nitidum* Ait.—H, M.

*V. nudum* L. var. *cassinoides* Torrey & Gray. Rocky, moist woods, streambanks; P, northern CuP. *V. cassinoides* L.—M, H, S, RAB.

4. *V. obovatum* Walter. Spring. Alluvial woods, very rare; southeastern OCP.

5. *V. prunifolium* L. Spring; summer. Open, upland woods, very rare; CP, VR, southern CuP.

6. *V. rafinesquianum* Schultes. Known by a single collection from VR; very rare.

7. *V. rufidulum* Rafinesque. Spring; late summer-fall. Upland xeric or rich woods; throughout. *V. rufotomentosum* Sm.—M.

#### 74. ASTERACEAE

1. Leaves opposite ..... 2  
 2. Ray flowers absent ..... 3. *Iva*  
 2. Ray flowers present ..... 2. *Borrichia*  
 1. Leaves alternate ..... 3  
 3. Pappus absent ..... 3. *Iva*  
 3. Pappus present ..... 4  
 4. Flowers unisexual; staminate and pistillate flowers in separate heads ... 1. *Baccharis*  
 4. Flowers bisexual ..... 4. *Solidago*

#### 1. *Baccharis* L.

1. Leaves linear, less than 5 mm wide ..... 1. *B. angustifolia*  
 1. Leaves elliptic to ovate, more than 6 mm wide ..... 2. *B. halimifolia*

1. *B. angustifolia* Michaux. Fall. Brackish marshes, rare; OCP.

2. *B. halimifolia* L., GROUNDSEL TREE. Fields, fencerows, brackish marshes, seepages; CP, AM (rare).—Much more common southeastward.

#### 2. *Borrichia* Adanson, SEA OX-EYE

1. *B. frutescens* (L.) DC. Spring-fall. Brackish marshes, low dunes; OCP.

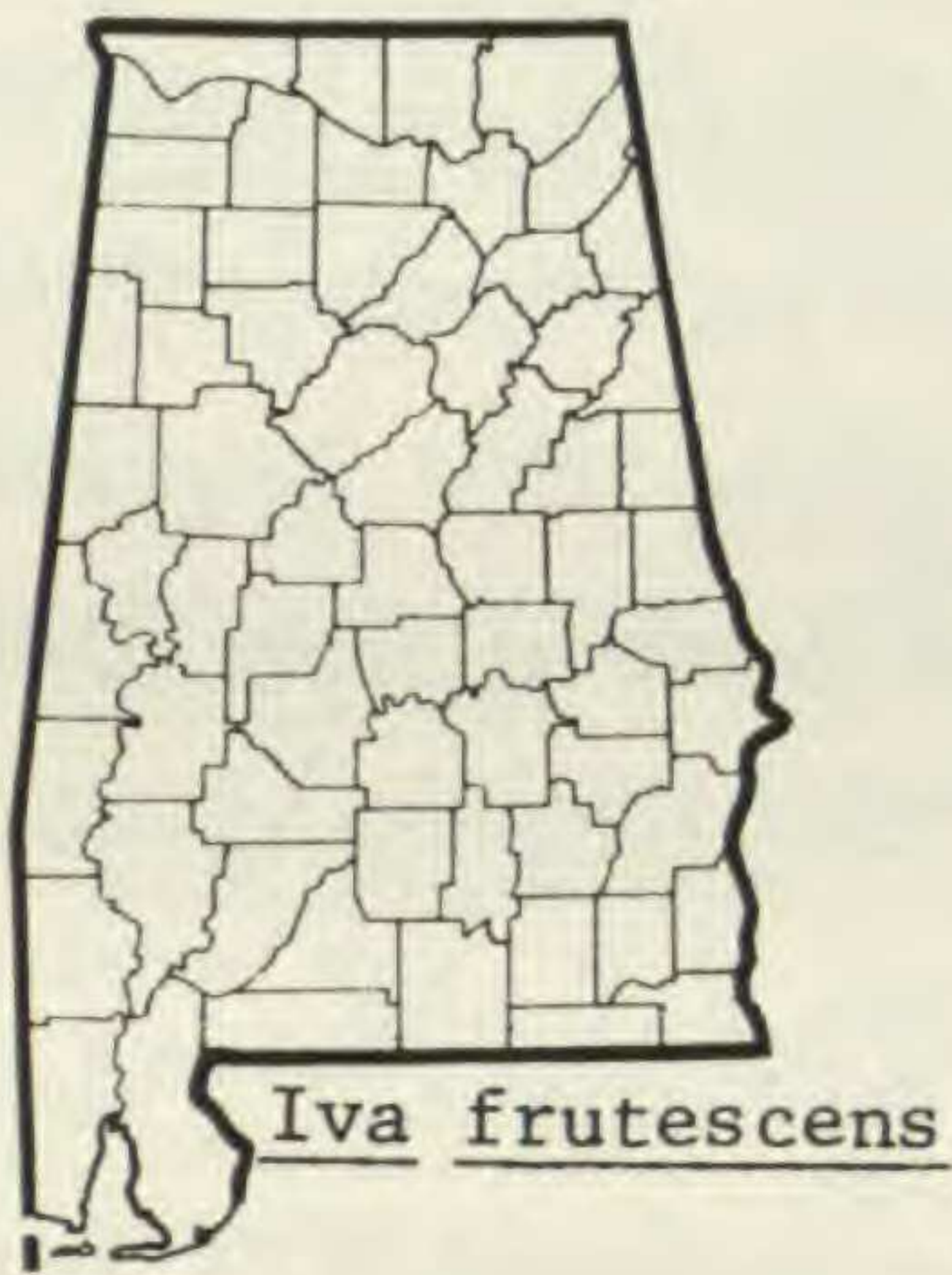
#### 3. *Iva* L.

1. Stems and leaves appressed-pubescent ..... 1. *I. frutescens*  
 1. Stems and leaves glabrous ..... 2. *I. imbricata*

1. *I. frutescens* L. Summer-fall. Brackish marshes; OCP. Reported by Mohr (1901), Harper (1928), and Dean (1961).

2. *I. imbricata* Walter. Summer-fall. Dunes; OCP.

74. ASTERACEAE



4. *Solidago* L.

1. *S. pauciflosculosa* Michaux. Fall. Dunes; OCP. *Chrysoma pauciflosculosa* Greene—M, S; *C. pauciflosculosa* (Michx.) Greene—H.

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